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T. N. KELYNACK, M.D.

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THE BRITISH JOURNAL
OF
TUBERCULOSIS

Vol. XXI. October, 1927. No. 4.

SYMPOSIUM.

THE RÔLE OF ACTINOTHERAPY IN TUBERCULOSIS.

ACTINOTHERAPY is now being extensively employed in the treatment of various forms of tuberculosis. With the oncoming of winter it is probable that there will be a considerable extension in the number of centres where artificial light will be employed. It seems desirable that an attempt should now be made to assess the actual value of this new agent in combating tuberculosis. We have therefore secured the opinions of a number of medical experts on the rôle of actinotherapy in the treatment of tuberculosis.

FROM LEONARD HILL,

M.B., F.R.S.,

Director, Department of Applied Physiology and Hygiene in the National Institute of the Medical Research Council, Hampstead, London; author of "Sunshine and Open Air," etc.

In the general treatment of tuberculosis exposure to cool air, promoting tone and metabolism, is, I think, as important as exposure to light. I agree with Sir Henry Gauvain in believing that there is much virtue in change from warmth to cold, from light to shade, to and fro; and with Mr. G. R. Girdlestone, who believes in the efficacy of short exposures of the naked body to cold air several times a day, even when there is no sun. We have evidence that the ultra-violet rays come more from the bright skyshine than from the direct sun at the zenith, and far more than from the sun low in the heavens. Ultra-violet ray treatment can be had, then, apart from the heating rays of the sun, and this may be advantageous in certain cases. There can, I think, be no doubt that the visible and near ultra-violet rays of the sun, by their heating and other possible effects, have therapeutic action as well as the far ultra-

violet rays of the sun. The biologically active ultra-violet rays of the sun are of longer wave length than those of arc lamps—above 3,000 A.U. in the case of the sun, below 3,000 A.U. in the case of arc lamps. There is no evidence, so far as I know, of any specific difference of therapeutic value between the longer ultra-violet rays of the sun and the shorter ones of the arc lamps. By their greater energy the effect of the longer ultra-violet rays of the sun may be no less or even greater than that of shorter rays of arcs on such reactions as erythema production, activation of ergosterol and formation of vitamin D, and increase of hæmobactericidal power of the blood as tested *in vitro*. We know that erythema is produced and ergosterol activated particularly by rays shorter than 3,000 A.U., but the intensity of the sun in rays longer than 3,000 A.U. is great enough to produce erythema and that activation. I do not see any sufficient evidence for calling the longer ultra-violet rays biotic and the shorter abiotic. The result on the living cells depends in each case on absorption and intensity of the rays. Small absorption may be made up for by great intensity, and the living cells so be killed by the longer ultra-violet rays of the sun, no less than by shorter rays of less intensity of an arc.

FROM PERCY HALL,

M.R.C.S., L.R.C.P.,

Hon. Actinotherapist, Mount Vernon Hospital; Author of "Ultra-Violet Rays in the Treatment and Cure of Disease."

The true value of actinotherapy in the treatment of the various forms of tuberculosis is neither sufficiently recognized nor admitted in this country. Whilst a growing body of opinion is agreed as to its usefulness in tuberculous lesions, involving the skin, glands, bones, and joints, there are many adverse opinions expressed as to its value in the treatment of pulmonary and other intra-thoracic forms of tuberculous disease. Actinotherapy in regard to tuberculosis is not yet placed on a proper scientific footing. Technique and dosage differ widely in different hands, as do also the sources of radiation which are employed. Reports published in the medical journals rarely give details as to the exact type of lamp used, such as power, output, the "distance" observed, exposure times, intervals between doses, and total number of applications given. Dosage is too often estimated in a haphazard manner, without regard to the patient's age, weight, tolerance, and powers of resistance. Unless and until more careful and precise methods of dosage are practised, a conflicting amount of evidence is bound to result. Actinotherapy acts on the human tissues as a general stimulant, and the stimulus must be adjusted to the patient's powers of resistance. If the dosage is correct, it is usual to find a gradual im-

provement resulting in the patient's condition, and that wherever the seat of the tuberculous disease may be, calcium metabolism is stimulated, appetite and digestion are improved, and the body weight increased. Actinotherapy acts (1) by stimulation of the central nervous system, via the nerve-endings in the skin; (2) through the blood-stream; (3) upon the skin itself by setting free into the blood activated "ergosterol" and other bodies, which are "vitamine precursors." It would also appear to have a stimulant effect upon the internal secretory glands. Ultra-violet rays certainly tend to increase iodine, calcium, iron, and phosphorus metabolism probably by favouring their absorption and cell-fixation. In the employment of actinotherapy there are three principal sources: (1) the carbon arc; (2) the quartz mercury vapour tube; (3) the tungsten arc. All these have their respective values and separate indications in different cases, according to the nature, extent, and situation of the tuberculous lesions, the stage of the disease, and the patient's "resistance" to it. The sequential use of different sources is frequently of great value. No one source is of universal value. So far as cases of pulmonary tuberculosis are concerned, nothing but ill will result if cases are treated when the patient's temperature is 100° F. or over. A rise of temperature over 100° F. is an indication that treatment should be suspended, and the patient kept at rest and in bed, Treatment can be resumed when the temperature falls to normal, and the dose lowered. With care a very large proportion of pulmonary cases can be helped towards recovery, including cases which had previously been on the down grade. Such, at any rate, has been the writer's experience. In the other types of tuberculosis, rapid improvement and cure result in the majority of cases treated if reasonable precautions are observed.

FROM A. C. ROXBURGH,

M.D., M R.C.P.,

Acting Assistant Physician for Diseases of the Skin, St. Bartholomew's Hospital.

My experience of actinotherapy in tuberculosis is based on the observation of about 160 cases treated in the Light Department of St. Bartholomew's Hospital during the last three years. The department forms part of the skin department, and is under the charge of Dr. H. G. Adamson, to whom I am indebted for permission to publish these observations. The types of tuberculosis treated have been chiefly lupus vulgaris and other forms of skin tuberculosis, tuberculous glands, and smaller numbers of other forms of the disease, not including pulmonary tuberculosis. In estimating the value of the results, one has to bear in mind that the majority of the patients were living in London, many of them in Central London near the hospital, and so were unable to get

much in the way of fresh air or sunshine. Other treatment was given concurrently in many cases, such as cod-liver oil or iodine internally, X rays to some of the gland cases, and local caustics to some of the lupus cases. About half the cases showed some degree of improvement in the tuberculous lesion (10 per cent. appeared to be cured), about a quarter showed little or no change, and about a quarter ceased to attend before they had had enough treatment to allow of any valuable opinion being given. Rather over half the cases gained weight, and showed an improvement in their general condition apart from the actual tuberculous lesion. In only a few of the tuberculous cases did actual harm seem to be done by actinotherapy. For example, one case of lupus and one case of sarcoid developed phthisis after courses of actinotherapy, which caused their visible lesions to heal up. To sum up, I should say that actinotherapy is a valuable aid in the treatment of many forms of tuberculosis, provided it is used with care; that it is of great value in a city hospital in that it enables one to do something for patients who are unable to get sanatorium treatment; but that it cannot take the place of fresh air, sunshine, and good food.

From CLAUDE RUNDLE,

O.B.E., M.D., M.R.C.S., L.R.C.P., D.P.H.,

Medical Superintendent to the Liverpool City Hospital and Fazakerley Sanatorium, Liverpool.

At our sanatorium for tuberculosis cases at Fazakerley the following sources of artificial light are employed: (1) carbon arc: two 75-ampere lamps in parallel; 70 volts direct; (2) one tungsten-arc; and (3) one Gauvain movable arc-lamp. The carbon arc we have used since February, 1924, and it is possible to arrive at fairly definite conclusions as to its therapeutic value. Fazakerley is one of the few sanatoria in this country which undertake the treatment of cases of adult surgical tuberculosis in considerable numbers, and it is particularly in this class of case that actinotherapy has been found to have unquestionable value; especially is this so in extensive tuberculous disease of the spine, or long bones, accompanied by sinus formation. The number of variable factors associated with individual cases makes comparative statistics of little value, but the results of personal observation of such cases before, and subsequent to, the introduction of actinotherapy leave no doubt as to the value of this agent in the healing of sinuses and exfoliation of sequestra. The results of carbon arc application in other tuberculous lesions may be summarized in the following: (*a*) *Adenitis.* Disappointing, except in the presence of open disease. Sinuses certainly close more rapidly. (*b*) *Pulmonary lesions.* Of doubtful value, and certainly dangerous unless exhibited with extreme care. (*c*) *Laryn-*

geal disease. In a few instances very rapid improvement has taken place, but the frequent association of pulmonary lesions restricts the application of actinotherapy in the majority of cases of this character. (*d*) *Abdominal tuberculosis.* Some very striking recoveries appear to have been the direct result of the application of the carbon arc. The application of the tungsten arc has been restricted to comparatively superficial tissues. In the treatment of tuberculosis of the skin, shallow sinuses, and bones of the smaller joints, its value has been clearly demonstrated. Old-standing lesions have rapidly yielded to its application; particularly is this the case when the local application of the tungsten arc has been combined with general irradiation by the carbon arc. The Gauvain movable arc lamp has been in use for a short period only, and an expression of opinion as to its value is not yet possible. It seems probable, however, that this apparatus may serve a most useful purpose in affording facilities for actinotherapy to those patients whose general condition makes frequent removal to a central department inadvisable.

FROM G. LISSANT COX,

M.A., M.D. (CANTAB.),

Central Tuberculosis Officer for the County Palatine of Lancashire.

In May, 1925, the Lancashire County Council granted leave of absence to Dr. J. Logan Stewart and Dr. A. D. Brunwin, two of our consultant tuberculosis officers, to enable them to study at existing light centres. Experimental light departments were later established at the Ashton-under-Lyne and Lancaster dispensaries under Dr. Stewart and Dr. Brunwin respectively. The following are our results up to January 1, 1927: The experimental work, during which six different types of lamp have been used, has shown that the most suitable light equipment for a tuberculosis dispensary serving a populous area is as follows: One or two long flame carbon arc-lamps; one Jesionek (or Hanovia) mercury vapour lamp; one Kromayer-water-cooled mercury vapour lamp. The carbon arc lamp, "Alpine Sun" pattern, was ineffective for light treatment at 15 amperes with plain carbons; when raised to 17 or 18 amperes, and iron-cored carbons employed, it proved much better. This type of lamp requires the whole attention of the nurse. The voltage for the "Alpine Sun" was 40 for each of four electrodes, and for the "Eidinow" carbon arcs 100. In 150 patients treated at the Ashton-under-Lyne centre, the tuberculous disease became quiescent and apparently cured in ninety-one. The average duration of treatment was under ten months. The same patients had previously had an average of sixty-three months' treatment by other methods. Many non-pulmonary cases which would otherwise be sent to institutions for

residential or out-patient treatment are suitable for light treatment at dispensaries with greater economy and not less beneficial results. For instance, of the ninety-one quiescent cases after light treatment at the Ashton-under-Lyne centre, five would normally have been recommended for sanatorium (pulmonary or orthopædic), thirty-three for general hospital and twenty-two for treatment at the skin hospital as out-patients. The estimated cost of their treatment would have been not less than £1,150, whereas their light treatment cost (all inclusive) £300, a saving of £850. Artificial light treatment has given specially good results in two groups of cases, namely, (1) lupus, and (2) adenitis with abscess formation and skin involvement. It is well known how refractory these conditions usually are to other forms of treatment. Our results are remarkably good with these classes of cases, particularly when it is remembered that many of the lupus cases had been under treatment for so long as twenty to forty years prior to commencing light treatment.

FROM G. B. DIXON,

M.R.C.S., L.R.C.P., L.S.A.,

Chief Tuberculosis Officer to the City of Birmingham and Medical Superintendent of the City Sanatorium.

It would be unwise to regard the application of artificial light to those suffering from tuberculosis as a complete method of treatment in itself; the best results will only be obtained when it is associated with other methods of treatment. Whatever treatment is used for tuberculosis, it must be undertaken before the disease is advanced, whilst the patient is capable of response, and it must be of long duration. Patients suffering from laryngeal tuberculosis cannot be excused silence, nor can the sufferer from joint tuberculosis be relieved from the tedium of prolonged immobilization because of actinotherapy. Lupus, adenitis, tuberculous laryngitis, when not associated with too active or too extensive pulmonary disease, and bone and joint tuberculosis, in many instances respond well to treatment by artificial light. Irradiation of the whole body surface will generally be found to give better results than a restricted application to the site of the lesion alone. In cases of lupus, the best results are obtained from treatment comprising both general and local irradiations. In laryngeal disease, good results are obtained from general irradiation of the body. If a thin vest is worn over the thorax, and if shorter periods of exposure are given than is usual when there is no associated pulmonary tuberculosis, the risk of reactions as indicated by a rise of temperature, increased pulse-rate, and hæmoptysis, may be obviated, if suitable cases have been selected for the treatment. Irradiation of the whole body by means of the carbon

arc lamp gives good results in the treatment of many forms of tuberculosis, provided that discretion in the selection of patients and in the application of treatment are constantly observed.

FROM A. NEVILLE COX,

M.D., B.S., M.R.C.P.,

Tuberculosis Officer to the County Borough of Brighton, and Visiting Physician to the Brighton Tuberculosis Sanatorium.

In Brighton we are using actinotherapy in selected cases of tuberculosis. No more than other methods can this treatment be used as a routine measure. On the south coast we are fortunately situated for natural heliotherapy, and we are satisfied that this gives better results than any artificial substitute. No doubt the tonic effects of moving air and the psychic effects of open sky play their part as well as the rays. We are fitting the sanatorium windows with "Vitaglass." In winter and on sunless days in summer we use a carbon arc lamp. No treatment is undertaken at the dispensary. A few out-patients are sent to the sanatorium; the majority, including all those who are working, go to a private light clinic in a central position in the town, where they are frequently seen by the Tuberculosis Officer. Two 30-ampere open arcs burning plain carbon, or iron-, nickel-, or tungsten-cored electrodes are used. We have no experience of the mercury vapour lamp, and have favoured the other type because of its spectral resemblance to sunlight, and also because I learned at the Finsen Institute in Copenhagen that carbon arcs had been found best in their long and large experience. Cases treated have been tuberculous glands, lupus, tuberculides, joint cases in a convalescent stage, peritonitis, pleurisy, and a few ill-faring children with indefinite signs of tubercle. We have not treated uncomplicated pulmonary cases, but a few tuberculous laryngitis patients have made encouraging progress. Most patients, we find, improve subjectively. Pigmentation and progress in our experience are generally, but not always, associated. The skin and gland cases have shown very definite objective signs of improvement, some of them after long periods of unsuccessful treatment by other methods. Some lupus cases seem to reach a stage when *local* treatment in addition to the general light baths appears to be needed. Our results in ambulant cases of peritonitis are not very satisfactory. We have seen no lasting ill-effects from actinotherapy, but have sometimes been disappointed by new foci of tubercle appearing during treatment. This, however, is seen also under natural heliotherapy. In some other diseases light treatment doubtless may promote rapid and permanent cures, but in tuberculosis it is inevitably prolonged and expensive.

FROM ALEXANDER BROWNLEE,

M.D., F.R.C.S.E., D.P.H.,

Medical Superintendent Tuberculosis Hospital, Glan Ely, Fairwater, near Cardiff, Wales.

In connection with the tuberculosis service of the King Edward VII. Welsh National Memorial Association actinotherapy has now been adopted. My opinion is based on work at the Tuberculosis Hospital at Glan Ely, near Cardiff. Treatment of tuberculous patients by natural sunlight (as far as climatic condition allowed) was carried out here for twelve years. An artificial sunlight department was started three years ago on a small scale, and this summer a new "Light" department has been opened. The apparatus installed consists of three Finsen Reyn lamps, a 30-ampere carbon arc lamp, two 20-ampere arc lamps, and a mercury vapour lamp. The Finsen Reyn lamps are used particularly for the local treatment of lupus and tuberculous ulcers resulting from broken-down glands. The 30-ampere arc lamp is used for general irradiation, and six patients can be treated at a time. The 20-ampere arc lamps are arranged on each side of couches on which patients (who must be in the recumbent posture) lie. The mercury vapour lamp is used for general exposures, the advantage being that short exposures are necessary—in fact, long exposures would be harmful. Our results up to date have been most encouraging. Some very bad cases of lupus have done exceedingly well, chiefly, I think, from local treatment with the Finsen Reyn lamp, although they have also had general light baths. All kinds of tuberculous condition have been treated with the carbon arc lamps, and the general impression one gets is that superficial wounds benefit and heal as a result, but that ulcers and sinuses arising from deep-seated bone disease are not much affected. I have found that the mercury vapour lamp and the carbon arc lamps give particularly good results in cases of abdominal tuberculosis.

ORIGINAL ARTICLES.

THE EQUIPMENT OF AN ULTRA-VIOLET RADIATION CLINIC.

By M. WEINBREN,

M.R.C.S. (ENG.), B.SC. (S. AFRICA), D.M.R.E. (CAMB.),

Medical Officer in charge of the X-ray and Ultra-violet Departments of the Queen's Hospital, Sidcup; Hon. Actinotherapist, the Mount Vernon Hospital.

THE demand for treatment by ultra-violet radiations has extended throughout the country. Large and small hospitals alike are finding themselves almost compelled to install plants. The initial step, the provision of appropriate and efficient apparatus, is a matter of considerable anxiety. This is due to the fact that no standard technique as yet exists; and the question of the relative merits of the carbon arc and the mercury vapour type of apparatus is still the subject of considerable controversy.

The choice of apparatus must depend to a certain extent on the size of the clinic to be equipped and the number and types of patients to be treated. A large institution will have problems which can only be solved by a consideration of all the local conditions; such an institution will be in the fortunate position of having some member of the staff probably the radiologist, who is in a position to settle technical difficulties. A smaller institution may not be so fortunate, and for such it is hoped that the following notes may be of some assistance.

The Choice of Apparatus for Actinotherapy.

The first question most frequently asked is, What source of ultra-violet radiation is the best—the carbon arc lamp or the mercury vapour lamp? A dogmatic answer in favour of one or the other cannot be given. Each lamp has its advantages and disadvantages. There is a geographical distribution for preference of one type or another. America favours the mercury vapour; Denmark is, of course, in favour of the carbon arc; in England the carbon arc is more in favour than the mercury vapour, especially for hospital practice.

A study of the literature of the subject will show that good results have been reported with both types of lamp in the treatment of some pathological conditions. With the exception of Reyn's work on lupus,[1]

[1] Reyn, A., *Radiology*, vol. iv., No. 4, April, 1925, p. 307.

records of a long series of similar cases treated by the same observer with both types are not forthcoming. This, of course, would be the only method of settling the controversy, but the difficulties of getting such comparative data from the same observer are obvious, and probably only a research council could supply such figures as are desirable for the formation of a sound judgment.

The room space available must influence the choice of apparatus. The carbon arc lamp has decided advantages for hospital purposes in that a number of patients can be treated at the same time, but it demands a definite minimum space and arrangements for ventilation. While it is easy enough to draw plans of a light department showing treatment room, dressing rooms, offices, etc., but few hospitals can afford an elaborate or complete installation. Most often some spare room, or even a room which is only occupied part of the day, will have to be utilized, and the question then naturally arises, What apparatus is most suitable for the available room?

Treatment with the carbon arc is given at a distance of from 4 to 3 feet. Allowing space for the operator to move and a circle of eight patients to sit comfortably, it means that a minimum-sized room for a carbon arc should be one which will contain a circle having a diameter of 12 feet. Where bed cases have to be treated two arcs are a decided advantage, but not absolutely essential. The room will have to be correspondingly larger than that required for ambulatory cases. Each arc ought to be provided with a switchboard, an ammeter and a voltmeter, and wherever possible the arcs should be separate units and not connected in series.

The disadvantages arising from heat and fumes given off from the carbon arc have, I think, been exaggerated. Efficient ventilation without causing draughts can always be obtained by a small fan placed behind a louvre shutter in the top part of a window. During the winter months the heat of the arc is an advantage, but would probably be insufficient to keep the room adequately warm, and provision should always be made for the use of an electric heater when required. Where the room may have to be utilized for other purposes, the carbon arc can be suspended from a stand; this will be found more suitable than the type hung from the ceiling. When the treatment is over, the lamp can be pushed into a corner, particularly if it is not directly connected with the switchboard, but is made to plug into the floor or wall, or other convenient point. The floor of the room should, if possible, be of fireproof composition, but where expense is a consideration a sheet of asbestos composition, placed under the arc, will serve the purpose equally well. A dressing room with an entrance into the treatment room and a separate exit is essential.

The Use of the Carbon Arc Lamp.

In the main there are two types of carbon arc lamps now in use, the long flame and the Finsen (open arc). The Finsen arc is operated on the assumption that the ultra-violet radiation is mainly emitted from the white hot crater on the positive pole. For the long flame arc it is claimed that the ultra-violet radiation comes mainly from the flame. Clinically it will be found that an erythema is produced far more rapidly from the long flame type than from the Finsen type, and a recent paper by Griffith and Jack[1] demonstrates the greater efficiency of the former. It is therefore not essential that the arc should be of the direct current type, as insisted on by Reyn.[2] It will be found, however, that the direct current arc operates more smoothly and needs less attention than the alternating current, though where the main supply is alternating it is doubtful whether the expense of a rotary converter is justified for these advantages.

Types of Electrodes for Artificial Light Lamps.

For the long flame arc various types of cored electrodes are now supplied. One type, the "white flame," is cored with cerium fluoride; another type is cored with tungsten. The average erythema dose at 4 feet with the white flame electrodes on the 30-ampere arc is ten minutes. For routine purposes these electrodes will be found most serviceable. The positive electrode will be consumed in six hours, the negative will last about twelve hours. After a long period of treatment, and where the exposures become too prolonged, the tungsten cored electrodes will reduce the length of exposure. Also where a greater concentration of shorter rays may be required, the tungsten cored will be of more service. The bactericidal power of the tungsten cored electrodes for staphylococci is forty seconds at 4 feet, while with the white flame it is approximately eight minutes. The greatest care should be taken not to confuse the electrodes in actual use.

The accessories supplied for the carbon arc, such as reflecting shield and lenses for local treatment, will be found unnecessary for hospital practice. The reflecting shield makes treatment on only one side of the arc possible. For local treatment it is better to use specially designed apparatus, such as the mercury vapour.

The Mercury Vapour Apparatus.

The mercury vapour lamps are of two chief types.

I. The Air-Cooled Type.—The direct current apparatus is cheaper and runs more smoothly, particularly where there may be

[1] Griffith and Jack, *British Journal of Actino-therapy*, June, 1927.
[2] Reyn, A., *Acta Rad.*, vol. iv, fasc. 4, No. 20, August 15, 1925.

considerable fluctuations on the mains, but the alternating current burner gives a somewhat larger output of ultra-violet.[1] The difference between the A.C. and D.C. types is not vital, and where the main supply is A.C., say, at 200 volts, and a converter may be present for electro-therapeutic purposes, supplying D.C. at 100 volts, it is better to use an A.C. burner at 200 volts. The 100-volt burner has a small radiating surface, and is a relatively poor source of ultra-violet rays, and where a number of patients are being treated, it will have to be cleaned too frequently. The disadvantage urged against the vacuum burner—*i.e.*, that the hammer action of the mercury when striking the arc may break the burner—does not count. Such an accident would be due to gross carelessness, and I have never known it to occur. In any case where the supply is A.C. there is no choice, because the atmospheric type is made for D.C. only.

The advantages claimed for the mercury vapour apparatus for general irradiation are: (1) The exposures are shorter; (2) absence of heat and fumes; (3) cheaper in operation; (4) less floor space required. These points deserve some consideration.

1. *Shorter Exposure.*—The first exposures are undoubtedly shorter. An erythema dose is obtained on an average of one minute at 2 feet with a 200-volt A.C. burner, as compared with ten minutes at 4 feet for the carbon arc. But as treatment progresses, exposures may go to ten and fifteen minutes, so that the number of patients to be treated per day with one lamp becomes very limited. With the Jesionek type, more than one patient can be treated at a time, but this lamp is not adapted for local treatment.

2. *Absence of Heat and Fumes.*—It has already been mentioned that the disadvantages of heat and fumes from the carbon arc are exaggerated. There is one advantage of the mercury vapour lamp in that it is less likely to cause "heatstroke" in susceptible patients. This effect is really due to the visible rays of the carbon arc, and not to the heat rays.[2] This susceptibility is but infrequently met with, and can be obviated by protecting the back of the neck and head when the back is being treated.

3. *Cheaper in Operation.*—Although the mercury vapour lamp consumes less current than the carbon arc, the cost of cleaning the burner at intervals must be added to the running expenses. This also necessitates a spare burner for use during cleaning operations, and is a source of annoyance in that it means revising the doses of all the patients. In fact, the continually varying output of the mercury vapour lamp, apart from the period when spare burners are in use, makes frequent

[1] Coblentz, W., *American Journal of Electro-therapeutics and Radiology*, vol. xliii., No. 12, December, 1925.

[2] Mayer, E., "Clinical Application of Sunlight and Artificial Radiation," p. 98.

revision of the doses essential, and is one of the main disadvantages of this type of apparatus. It follows from this also that the mercury vapour lamps are not interchangeable. A patient cannot be treated with one lamp one day and with another the next. The carbon arc, on the other hand, will operate for very long periods without requiring expensive cleaning or spare parts. The writer has ten arcs in operation. Some of these have been in constant use for two and a half years (five days a week, six hours a day), with the total cost of repairs being a few shillings.

4. *Space.*—This may be the deciding factor where space is of paramount importance. The relative merits of the carbon arc and the mercury vapour spectra cannot be adequately discussed here. It should be remembered that a large number of cases will be sent for prophylactic treatment during the winter months—*i.e.*, the physician will expect the deficiency in ultra-violet rays under natural conditions to be made good by artificial sources. For these patients the carbon arc, having a spectrum which more closely approximates to that of the sun,[1] is indicated.

II. Water-Cooled Apparatus (Kromayer).—For specialized work, such as treatment under compression or treatment of special parts, the water-cooled mercury vapour is advised. Although requiring careful handling, the amazing direct bactericidal power of the lamp, the ease and rapidity with which any desired degree of erythema can be obtained, and the facility for getting the direct effect of the rays on any part desired, make it the most valuable apparatus for local treatment. The quartz applicators make local treatment in otherwise inaccessible parts possible. The apparatus requires more skill and care than any other source of ultra-violet rays. The greatest danger is that the lamp will be worked, sooner or later, without an adequate supply of water. A few minutes' running of the lamp without water means ruining the burner. A pilot lamp which will light up as soon as the current is switched on should obviate all such risk.[2]

Accessories for the Kromayer Type of Lamp.

A series of quartz applicators will be required. A great variety of these are now made, and the various firms will supply applicators to any special design. The following set will be found necessary for routine work: a square lens for compression; a Sampson laryngeal applicator; a straight rod applicator; a nasal applicator; a right-angle dental applicator.

Although Gauvain prefers all his apparatus in the same room, Reyn advises separate rooms for the carbon arc and mercury vapour

[1] Coblentz, W., *American Journal of Electro-therapeutics and Radiology*, vol. xliii., No. 12, December, 1925.
[2] Weinbren, M., *British Medical Journal*, January 29, 1927.

lamp.[1] The latter arrangement with the mercury vapour lamps under the care of a special operator has its advantages.

Accessories for Service in the Light Department.

The following appliances will be found of service: (1) A timing device for work with the mercury vapour apparatus is essential. (2) Goggles and slips will be necessary. Goggles with a rubber or cloth rim will be found better than those with a metal rim. (3) Dosimeters. Many methods of measuring the intensity of ultra-violet rays have been introduced. For routine therapeutic purposes they are of little value and not essential. For measuring the fall in efficiency of the mercury vapour apparatus, it is simplest for the operator to do an erythema test on himself at intervals. The carbon arc should not vary in output if the ammeter and voltmeter readings are kept constant. Large consignments of electrodes should be ordered at a time, as there may be a small variation in composition with each supply.

With the above apparatus there should be no difficulty in treating any condition in which ultra-violet radiation may be indicated. With one long flame arc, one air-cooled mercury vapour, and one water-cooled mercury vapour (Kromayer), fifty ambulatory cases can be treated daily with both general and local exposures.

ACTINOTHERAPY IN TUBERCULOSIS OF THE SKIN.

By W. J. O'DONOVAN,

M.D.,

Physician in charge of the Skin Department of the London Hospital; Consulting Physician, Light Department, Whipps Cross Hospital; Physician, St. Paul's Hospital for Diseases of the Skin.

The active attack against cutaneous tuberculosis in this country can very properly be dated from the first appointment of an assistant physician to the photo-therapy department at the London Hospital in 1900. It is probably safe to say that even Dr. Sequeira, fresh from his intensive studies at Copenhagen, did not, at that time, visualize the developments that would follow in his own department, and could not see the extent to which his work would be applied by the administrative medical services of this country. Elderly "Londoners" will remember huge lenses a foot in diameter by which none too successful attempts were made to catch the sunlight on the lawn at the back of the London Hospital. An obvious advance on this was the housing of arc

[1] Reyn, A., *Acta Rad.*, vol. iv., fasc. 4, No. 20, August 15, 1925.

lamps in a temporary tin shed in the garden, and from this developed the Finsen Light department, in which, to this day, the original Finsen technique is faithfully carried out.

In treating lupus, besides curing the disease, it is important, especially in facial cases, to secure a smooth supple scar. There must be as little loss of tissue as possible. It is equally important to avoid ugly keloidal scarring, contractures, and abnormal vascularization. These needs are met by the results of Finsen Light therapy, and are fully met by no other form of treatment. Away from the face, other methods of procuring a local reaction may properly and advantageously be employed. The water-cooled Krohmeyer lamp, cauterization, painting with strong acids, and excision have their part in the treatment of lupus on covered areas of skin. Finsen Light treatment, needing as it does the continuous employment of a nurse to compress the blood from the treated spot, is expensive, and is avoided wherever other methods may properly be employed. It is to Dr. Adamson of St. Bartholomew's Hospital that we owe the revival in England of painting out lupoid tissue with acid nitrate of mercury. Not only may small single areas be destroyed by its use in one short sitting, but exuberant masses of ulcerated lupoid granulation tissue may be planed down from the nose, cheeks, or ears, and the smooth area so produced is thus rendered amenable to Finsen therapy.

The passage of time has shown that the light department cannot stand on its own legs. For the proper service of the patients the whole hospital team must be employed. Lupus of the face is so often complicated by dacryocystitis and by intranasal lupus that a light department without the cordial and constant co-operation of the ophthalmic and nasal specialists would be inefficient. The early promise of X rays has not led to our continuance of their use. Today students are warned not only of the after fragility of skin that has been treated by X rays, but a lupus scar produced by this therapy is apt to develop in a decade of years, or perhaps more, a carcinomatous ulcer, which, if not diagnosed with great rapidity, will become quickly inoperable and fatal. The school medical service of the London County Council performs a valuable initial service in discovering untreated cases of lupus in the school population. Parents, of the slacker type, are accustomed to bring children, suffering from tuberculosis of the skin, for treatment at fourteen when they have been refused remunerative employment. The fact that tuberculosis officers and relieving officers, acting in conjunction, can furnish these patients with their fares, can help to pay part of the cost of their treatment and of their lodging near the light department, is a tremendous encouragement to hospital staff. Before this administration took shape the tragedy of

our light department was the dropping away of the heedless and those enmeshed in domestic difficulties.

The addition, in 1922, of general light baths to the armamentarium has certainly halved the average time taken for the cure of lupus by local light therapy; moreover, it has extended the ambit of curable cases to include many extensive and spreading forms of lupus that were previously sent away; so baleful a lesion as tuberculous pseudo-elephantiasis of a limb has proved to be amenable to daily general light baths. Progress photographs are essential to meet the reasonable requests of local bodies for regular reports on their patients. Rarely the occurrence of hæmoptysis or of tuberculous meningitis with a fatal issue reminds one that the tubercle bacillus is a subtle antagonist, and that potent methods of attack may be followed, at times, by grave sequelæ.

The extension of light treatment to include daily sessions of general light baths carries with it the need of supervision of the conduct and education of such patients, and to meet this need the London County Council stepped into the breach and established the first lupus school in the British Islands. At the London Hospital treatment by general light baths originated in the skin department, and here, as in other large hospitals, light therapy has developed apace under the care of the skin physician. This specialist, by the development of light therapy, has been brought into contact once more with the general stream of cases of wider medical interest. When the good results in cutaneous tuberculous disease are so demonstrable, the department cannot refuse to treat cases of tuberculous nephritis, or tuberculous irido-cyclitis, of phlyctenules, and of gland tuberculosis that are directed to it. I think one may safely record that tuberculous glands and tuberculous bone and joint disease seem to do better under light therapy if a sinus has already developed. Tuberculous adenitis itself, treated by general light baths, sometimes slowly disappears, in other cases there is a rapid swelling of the inflamed gland, an external discharge of its contents, and a rapid cure, but no amount of light therapy will have any effect upon a sinus that has calcareous glands at its base; such foreign bodies must first be curetted away by the surgeon.

One of the greatest aids the light department has is the confidence and support of tuberculosis officers. Some seem wayward in sending their early and favourable cases away to sanatoria, rarely they treat promising cases by "brass paste" or tuberculin, but such administrative vagaries are rare and interesting. It is one's duty to note how consistent, painstaking, and patient is the manner in which our patients suffering from cutaneous tuberculosis are assisted morally and financially by the constant watchfulness of our public health

FINSEN LIGHT TREATMENT TODAY IN THE LONDON HOSPITAL.

EARLY EXPERIMENTS IN LIGHT THERAPY AT THE LONDON HOSPITAL.

authorities. Early lupus is always curable. Advanced lupus in young people is a curable disease. What is done at the London Hospital can be done elsewhere, and any practitioner who has cured a case of lupus will realize that his cured patient will rapidly bring to him two others worse than himself. We have at the London Hospital but one *regret*, and it is that *we are where we are*. Nine hundred treatments are given weekly, and were we transplanted to a better climate the permanent value of our work might be improved. The drawback of site, however, is insurmountable, and we find it necessary to recall our weaker patients winter by winter for a short preventive course of light baths after their lupus has apparently been cured.

ERGOSTEROL AND ULTRA-VIOLET RAYS.[1]

By ERIC HOLMES,

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In a paper dated April 4, 1927, Rosenheim and Webster[2] have ended a chapter in vitamin research that was opened by Mellanby in 1919.[3] Mellanby, following up the work of Hopkins, made a series of experiments on puppies, and concluded that rickets was caused by the absence from the diet of some accessory food factor; he was inclined to identify this factor with vitamin A, a substance in which cod-liver oil was known to be particularly rich.

Mellanby's conclusions met with opposition. Workers of the Glasgow School, in particular, contended that fresh air and exercise were alone sufficient to protect against rickets, without the presence in the diet of any special protective substance. The trend of further work soon showed, however, that while, on the one hand, rickets could be prevented in animals simply by including in their diet certain foods containing some accessory substance, on the other, this substance could not be identical with vitamin A. Vitamin A could be eliminated, so that the animals showed failure of growth and xerophthalmia, while they were still protected against rickets. The rickets-preventing factor was labelled "D."

In 1921, the data collected by workers at the post-war relief hospitals in Vienna became available.[4] From these reports, it became evident

[1] Through the kind introduction of Professor W. E. Dixon, F.R.S., of the Pharmacological Laboratory, Cambridge, the editor of this journal has been able to secure Dr. Eric Holmes's valuable survey regarding ergosterol and ultra-violet rays, a subject of particular interest to many of our readers and especially to those dealing with rachitic and tuberculously disposed children in sanatoria and open-air schools.—EDITOR, *B. J. T.*

[2] Rosenheim and Webster: *Biochemical Journal*, XXI., 389.

[3] Mellanby: *Lancet*, 1919 (i.), 407.

[4] Chick: Report to the Medical Research Council, 1922.

that rickets could be prevented in children either by exposure to sunlight or by a liberal milk ration, provided that the milk was obtained from cows that were pasture fed, and had not been kept in stables and fed on oilcake.

Shortly after this, two sets of workers[1] reported, independently and almost simultaneously, that experimental rickets could be prevented if the foodstuffs on which animals were fed were irradiated with ultra-violet light, though the materials, before raying, were quite free from vitamin D. Further, rickets did not occur if the animals themselves were irradiated. It was also reported[2] that the disease could not be induced in rats living in glass bell jars, if the latter (without the rats) were periodically exposed to ultra-violet rays. It was soon found, however, that this was not due to any effect of the raying on the glass or the contained air, but to the raying of the sawdust bedding, which was kept in the jars, and which the rats subsequently ate.[3] From this work, too, another most important point emerged.[4] While ultra-violet light causes the appearance of vitamin D in foodstuffs from which it was previously absent, it destroys vitamin A, so that, if a food material be rayed, while it becomes richer in D it simultaneously becomes poorer in A.

While experiments of this type were in progress, attempts were made to fractionate foodstuffs, such as cod-liver oil, known to be rich in the vitamin, and, if not to isolate it, at least to concentrate it, and to decide with which fraction it was associated. It was found, first, that it was associated with the fats; next that it was found in the "unsaponifiable residue" of the fats—that is, with substances which, though possessing some of the characteristics of fats, were not glycerine esters of fatty acids, and therefore not fats in any strict sense. Finally, the substance was found to accompany the sterols, a group of complex alcohols, of which cholesterol is the best known. While purified cholesterol was quite incapable of protecting rats against the onset of rickets, it was soon shown that the substance acquired the power of so doing if it were exposed, in the absence of air, to ultra-violet light.[5] There was, however, an optimum period of exposure. Prolonged exposure not only failed to produce more vitamin, but destroyed that already present: moreover, from a definite amount of cholesterol, only a certain small amount of active substance could be produced. Chemical examination of irradiated cholesterol resulted in the recovery of 99·9 per cent. of it as the pure, inactive alcohol, which could not be further activated. Although the cholesterol employed in these experi-

[1] Steenbock and Black: *Journal Biological Chemistry*, 61, 405; Hume: *Lancet*, 1922 (ii.), 1318.
[2] Hume and Smith: *Biochemical Journal*, XVII., 364. [3] *Ibid.*, 1334.
[4] Willimot Moore and Wokes, *Biochemical Journal*, XX., 1292.
[5] Rosenheim and Webster: *Lancet*, 1925 (i.), 1025

ments was, judged by the ordinary criteria of the organic chemist, a pure substance, yet these results suggested very strongly that it was contaminated by a small but definite amount of some impurity—the "provitamin D" as it was called.

Certain workers[1] observed that the absorption spectrum of ordinary cholesterol showed very marked absorption bands in the ultra-violet. These bands disappeared after exposure of the material to ultra-violet light. They were lost, too, after purification of cholesterol by certain chemical methods, particularly by bromination, and by certain reactions involving fairly drastic oxidations: and cholesterol so treated could no longer be rendered antirachitic.

The inference was that the vitamin precursor was responsible for the absorption bands. This observation made experimental work much easier, in that it allowed the substitution of spectroscopic examination for tedious and very costly animal feeding experiments.

From the evidence it was likely that the provitamin was itself a sterol. Only some such nearly related substance could contaminate cholesterol and escape detection by the ordinary methods. Examination of other known sterols revealed the fact that ergosterol, first isolated from ergot, but, as the event has proved, very widely distributed in nature, showed the absorption bands to a most intense degree. These bands are no longer visible after irradiation, and animal experiments show that irradiated ergosterol will cure, or will prevent, rickets in rats in doses of $\frac{1}{10000}$ mg. per rat per day. The lower limit of its activity has not yet been reached, but it is predicted that $\frac{1}{30000}$ mg. will probably prove sufficient. It is interesting that, unlike vitamin A, vitamin D exerts no harmful effect in large doses.

In the light of this new information, it can be shown that cholesterol obtained from almost any natural source—human, animal, or plant (including yeast)—contains the provitamin. It is not difficult, therefore, to explain the antirachitic effect of ultra-violet rays, derived either from the sun or from a mercury lamp, in curing rickets, nor, since the provitamin is almost ubiquitous, is it any longer a puzzle why it does not seem to matter whether the animal or merely its food is irradiated; why cows fed on sun-irradiated pasture yield vitamin-rich milk, while those fed on oilcake in dark stables give milk that has no anti-rachitic properties.

It will appear, from what has been said, that this work in itself does not establish any relationship between ergosterol or ultra-violet light and the treatment of any disease except rickets. Indeed, irradiation tends to destroy vitamin A. Irradiated air, too, fails to benefit rats on a vitamin-deficient diet. Cod-liver oil, rich in both the A and D factors, is universally believed to exert a beneficial effect on tuberculosis; fresh air and

[1] Herlbron, Kamm, and Morton: *Journ. Soc. Chem. Ind.*, 45, 932.

sunlight are proven methods of treatment: whether their effect depends at all upon the presence of either vitamin can hardly be established until it can be demonstrated that there is a relationship between such a body and the bacillus, or the manner in which the tissues react to its presence. Here is opportunity for further researches which might well be taken up in laboratories of the British hospitals and sanatoria dealing with tuberculous cases.

HUMAN AND BOVINE TUBERCULOSIS IN GUERNSEY.

By HENRY DRAPER BISHOP,

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States Medical Officer of Health for the Island of Guernsey.

Bovine tuberculosis seems to have been unknown in Guernsey until the year 1902. Tuberculin testing of cattle was started by the officials of the United States Veterinary Department. It may be said at once that the American cattle buyers by the extent of their purchases exercise a great influence here, and they have materially helped to banish bovine tuberculosis from the island. After a considerable number of cattle had been tested, and always with a negative result, the United States Veterinary Department came to the conclusion that Guernsey cattle were immune to tuberculosis, and allowed them to be imported into America without having been previously tested. In 1902 came a bolt from the blue: cattle from Guernsey imported into the United States were found to react to the test, and this optimistic opinion was thus proved to be false. In 1901 a local breeder applied to the Royal Court of Guernsey for permission to bring back to the island some cattle which he had sent to a show at the Agricultural Hall, Islington. Such a course was contrary to the regulations then existing, but, unfortunately, permission was granted. These cattle were subsequently found to be suffering from tuberculosis, and an extensive outbreak of the disease occurred. The Royal Court acted very promptly, and passed a drastic "Ordonnance" to cope with the situation without delay. Farmers all the world over are a conservative body, and as much so in Guernsey as anywhere else, so it may be imagined that the task of the officials who had to carry out the necessary work, overcome the hostility to the test, and, where necessary, subsequently order the slaughter of the cattle, often apparently healthy, was not an easy one. However, these difficulties were overcome, and

again one must acknowledge the valuable help that was given by the American buyer. The "Ordonnance" required that every bovine animal reacting must be at once slaughtered and the owner compensated. Compensation was to be given on a generous scale, but, of course, not one that would meet the case of an exceptionally valuable animal. If a cow in calf were found to be affected, under certain conditions of isolation she might be allowed to calve, but was afterwards slaughtered. Additional clauses provided that no animal could be sold or transferred from one farm to another unless it had been previously tested and found to give a negative reaction, and that no live cattle were allowed to be brought into the island except for the purpose of immediate slaughter at the States abattoir. This last clause was struck out many years ago, and now no live cattle are allowed to be imported into Guernsey at all except from the other islands of the bailiwick—Alderney and Sark—and they are isolated and tested on arrival. These Channel Islands, however, can only import cattle through Guernsey, and subject to the regulations in force there.

Now for statistics: during the ten years 1910 to 1919, 2,426 cattle were tested by the States veterinary officials. This does not represent the total number tested, as during this period the number tested unofficially by veterinary surgeons is not recorded. The number of animals reacting during this period was 191. The "Ordonnance" directs that any veterinary surgeon is required to report the occurrence of a case of bovine tuberculosis to the authorities immediately such case comes to his notice. I think that this clause was loyally observed.

I now pass to consider the three years, 1924, 1925, and 1926. The total number of animals tested officially and unofficially was 2,882. Of this number there were two reactors only. Perhaps it may be interesting to mention that the number of cows in calf and in milk in Guernsey for the year 1926 is given as 2,590 according to the census required by H.M.'s Receiver-General.

We can now turn to data relating to human tuberculosis in Guernsey. It may appear strange that no accurate figures can be given for the years prior to 1909, but until the year 1908 it was not necessary to produce a medical certificate giving the cause of a death, and the death of any person could be registered without it. In the majority of cases it is true that such a certificate was forthcoming, but in a great many it was not. Therefore such registered causes of death as "consumption" and "decline" cannot be officially accepted. It is convenient to compare the periods—ten years, 1910-1919, and the three years, 1924, 1925, and 1926—previously mentioned in connection with bovine tuberculosis. In the ten-year period the average population of Guernsey was 40,833. The total number of deaths from tuberculous

diseases was 478. Of these 357 were registered as due to phthisis, and 121 to other forms of tuberculosis. I do not think, however, that these figures are entirely accurate, as 47 of the latter were registered as due to "tuberculosis," and a certain proportion of these were probably due to phthisis, but I have accepted them as registered. The percentage of deaths under five years of age to the total was, during this period, 8·5 per cent.

Now for the three years, 1924, 1925, and 1926, the average population (an underestimate I am sure) was 38,650. The total number of deaths registered as due to tuberculosis was 123; of these 103 were due to phthisis and 20 to other tuberculous causes. There were two deaths under five years of age, or 1·7 of the total. Further details are given in the following tables:

TABLE A.—INDICATING SELECTED MORTALITY RETURNS, 1910–1919.

Ten Years (1910-1919).	Number of Deaths.	Deaths at Various Age Periods and Percentages.
Phthisis	357	Under 1 year, 15 = 3·1 per cent.
Tuberculosis ...	47	1 to 5 years, 26 = 5·4 ,,
Tabes mesenterica ...	13	5 to 15 ,, 51 = 10·7 ,,
Meningitis	31	15 to 25 ,, 122 = 25·5 ,,
Peritonitis	12	25 to 65 ,, 251 = 52·5 ,,
Joints	9	Over 65 ,, 13 = 2·7 ,,
Kidney	7	
Lupus	2	
Total	478	

TABLE B.—INDICATING SELECTED MORTALITY RETURNS, 1924–1926.

Three Years (1924-1926).	Number of Deaths.	Deaths at Various Age Periods and Percentages.
Phthisis	103	Under 1 year, 0 = 0 per cent.
Tuberculosis ...	2	1 to 5 years, 2 = 1·6 ,,
Tabes mesenterica ...	—	5 to 15 ,, 10 = 8·1 ,,
Meningitis	3	15 to 25 ,, 39 = 31·7 ,,
Peritonitis	9	25 to 65 ,, 70 = 57·0 ,,
Joints	6	Over 65 ,, 2 = 1·6 ,,
Total	123	

TABLE C.—INDICATING THE JOINT STATISTICAL RETURNS REGARDING TUBERCULOSIS IN CATTLE AND HUMANS.

	Ten Years (1910–1919).	Years 1924–1926.
Cattle Tuberculin Tested: 2,426 (not the total, but official testing only)	—	2,882 (total)
Number reacting and notified according to law	191	2
Human Tuberculosis:		
Total deaths	478	123
Phthisis	357	103
Other forms of tuberculosis[1]	121	20
Deaths under five years of age	41	2
Percentage to the total number of deaths from tuberculosis	8·5	1·7
Average population	40,833	38,650

1926—number of cows in milk and in calf, 2,590.

It should be noted that no milk is imported into Guernsey, but there is a large import of butter.

A brief mention must be made to the climate of Guernsey. It is warmer in winter and cooler in summer than in the mainland, the coolness of the summer nights being marked. It holds the record of sunshine for the British Isles with an average of 1901·5 hours for the past thirty-three years. The mean temperature of the year 1926 was 52·2, and the mean daily range 8·3. The average rainfall of Guernsey was 34·35 inches, yet in parts of this small island it only averages 26·12 inches. The northern and flat part is very open and bracing; in the deep, tortuous valleys warmth and shelter from almost any wind can be secured. Guernsey cattle give milk very rich in butter fat, and of a natural yellow colour very marked in butter made from it. In its limited area most beautiful and varied scenery is to be found, and the same may be said of the thirty miles of its coast scenery. It is hardly to be wondered at therefore that a large number of persons suffering from tuberculosis, as well as other illnesses, come to it in search of health, and so often find it.

[1] Forty-seven of these were registered as being due to tuberculosis, and are therefore included in this total.

THE BLOOD SEDIMENTATION TEST IN TUBERCULOSIS.

By R. G. BANNERMAN,

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It is an old observation that the corpuscles of shed blood may, in certain conditions, settle out from the plasma before clotting takes place, so that a "cruor sanguinis" results. This phenomenon and its causation had been little studied until Fahraeus,[1] working with blood rendered incoagulable, noted that the rate of sedimentation (S.R.) was much higher in pregnancy and certain pathological conditions. Since his classical papers on the subject, an immense literature has appeared, especially on the Continent, and chiefly concerned with the test in tuberculosis; there is general agreement that the S.R. is a trustworthy reflex of the patient's condition.

The sedimentation test consists essentially in the measurement of the rate at which the corpuscles of citrated blood sediment in a vertically placed tube. Linzenmeier[2] measures the time taken for the layer of corpuscles to reach a certain level, and Westergren[3] notes the level reached after a certain interval of time. The latter method has obvious time-saving advantages, and the technique used in the writer's observations has been based upon it. It is important, in order to obtain consistent results, to have a stabilized technique with as few variable factors as possible. Blood is drawn from a vein into a syringe containing such a quantity of the anticoagulant citrate solution that the final proportion will be 1 to 4 parts of blood.

The concentration of sodium citrate used as anticoagulant appears, within broad limits, to be of small moment; 3·8 per cent. has been the strength used, after Westergren. A homogeneous mixture is made, and some of it drawn into a glass tube, which is then set upright. The difficulty of obtaining tubes such as Westergren describes led to the adoption of capillary thermometer tubing of about 1½ mm. internal diameter, and tested for uniformity of bore by measuring the length of a short column of mercury placed within it and moved from place to place. Uniformity of bore is of the utmost importance. It is found useful to take a column of citrated blood 100 mm. in height, so that the result may be read off as a percentage directly. Readings are made at the end of one hour and of two hours.

[1] Robin Fahraeus: *Acta Med. Scand.*, 1921, vol. lv., pp. 1–247.
[2] Linzenmeier: *Münch. Med. Woch.*, 1923, vol. xl., p. 1253.
[3] Alf Westergren: *Acta Med. Scand.*, 1921, vol. liv., pp. 247–82.

Only slight ligature pressure should be made to congest the vein which is to be punctured, for it has been shown that the CO_2 tension has an effect on the rate of sedimendation. The writer observed that considerable variations in the S.R. of the same blood might be found when the test was set up at varying times of the day and in different parts of the room, and it was found that these discrepancies were due to the fact of varying temperatures in these circumstances, for the sedimentation takes place more rapidly in proportion as the temperature is raised. For this reason all tubes are set up in the incubator at 37°, where the readings obtained, if high, are constant.

The mechanism of the sedimentation reaction is not fully understood, but the work of Fahraeus made it clear that the auto-agglutination of red corpuscles is an essential element, since on physical grounds a clump of red corpuscles will fall at a greater speed than discrete cells. To his observations on this matter may be added the results of the following experiment: a normal sedimentation rate can be greatly accelerated by the addition to the citrated blood of a small amount of the serum or plasma of an incompatible blood; the latter has, of course, the property of clumping the red cells of the test blood.

The other important factor is the ratio of plasma proteins one to another; Fahraeus demonstrated that in the mere rapidly sedimenting blood there is a relative excess of fibrinogen and globulin as against albumin, and also showed that corpuscles that have been washed free of plasma and then suspended in various protein solutions settle more rapidly in a solution of fibrinogen than in that of globulin, and less rapidly in albumin than in either of these. The S.R. of defibrinated blood is accordingly much diminished. A confirmation of these facts is given by the finding that if the plasma of citrated blood be separated from the corpuscles by centrifuge, and exposed to ultra-violet light in a quartz tube, the reconstitution of the blood by the addition to the plasma of its corpuscles results in an increased S.R., as against a control case in which the plasma of the same blood has been exposed under identical conditions but in a tube of ordinary glass, to exclude ultra-violet radiation. The action of ultra-violet, which traverses quartz but not ordinary glass, is to increase the amount of globulin in plasma at the expense of albumin.

The number of red corpuscles has but little influence on the S.R., which was found in a case of severe anæmia to be within normal limits. And although the number of blood-platelets tends to be high in just those circumstances in which the S.R. is raised, no causal relationship has been made out. One such case is active pulmonary tuberculosis (Bannerman[1]), and another active surgical tuberculosis.

With the incubator method and the tube length described, the

[1] R. G. Bannerman: *Lancet*, 1924, September 20, p. 593.

S.R. in the healthy child should not exceed 10 mm. per cent. in the first hour, or 21 mm. per cent. at the end of the second hour; in healthy adults the rates are often much smaller. The most critical phase in the sedimentation occurs within the first two hours, and it is notable that the second hour reading is normally at least double that of the first hour, so that the normal ratio is approximately 1 : 2; whereas in disease, with a rapid S.R., the ratio may be very different—*e.g.*, 60 to 70 mm. per cent., when the ratio would be 1 : 1·16. If the hourly readings of two such cases were plotted in the form of curves, they would differ widely in the first few hours, since whereas the normal curve in that time approximates to straight line, that of the blood of high S.R. would come down very steeply in the earlier part of the curve.

The test is not a specific one, and is therefore of little value in diagnosis; it has been proposed to derive from the test some information of a specific character. It is stated that the administration of tuberculin is followed by no change of S.R. in the normal individual, but is succeeded by a notable increase in the S.R. of a tuberculous individual (Popper[1]): the writer has been unable to confirm this or to gain any greater knowledge of a case than is given by the von Pirquet test. In matters of prognosis, however, the case is different, for the test appears to be a useful reflex of the subject's condition, and to give information which physical signs only give with a larger margin of variability. Careful and repeated examinations should be made with a reliable technique. Many workers have made such observations in the case of pulmonary tuberculosis, and there is a general appreciation of the value of the results. The writer has been able, at the Lord Mayor Treloar Cripples' Hospital, to carry out such observations in cases of surgical tuberculosis in children, and to confirm the view that the test gives a good indication of the activity of disease; in some cases the onset of a complication has been heralded by an increase of S.R. In some cases the appropriate treatment has been observed to lead to a lessening of the S.R. towards normal, a fall in the number of blood-platelets, and a rise in the number of eosinophil leucocytes, synchronously with the amelioration of the patient's condition.

The writer acknowledges gratitude to the Medical Research Council for a grant. Many thanks are due to Sir Henry Gauvain, the superintendent of the hospital, for his unfailing interest in this work.

[1] M. Popper: *Revue de la Tuberc.*, 1925, vol. vi., p. 497.

NOTES ON THE THIRTEENTH ANNUAL CONFERENCE OF THE NATIONAL ASSOCIATION FOR THE PREVENTION OF TUBERCULOSIS.

By WILLIAM BRAND,
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Medical Commissioner to the National Association for the Prevention of Tuberculosis.

The Thirteenth Annual Conference of the Association was held at the house of the British Medical Association on June 30 and July 1 and 2. Sir Arthur Stanley, Chairman of the Council of the Association presided during the first day. The Conference was opened by the Right Hon. Neville Chamberlain, Minister of Health, who said that the death-rate from all forms of tuberculosis in 1926 was almost exactly one-third of the rate half a century ago. While not forgetting the possibility that a progressive immunizing process is helping the white races, he would prefer to ascribe the drop in the mortality from tuberculosis to an improvement in the surroundings and the social conditions of the people and to the adoption of definite measures for dealing with the disease. He considered the framework of organization created throughout the country to deal with tuberculosis to be fairly complete, but gave instances where there is room for improvement—for example, in the notification of tuberculosis and in the carrying out of preventive measures. He stressed the value of education and of aftercare.

Sir John Robertson, Medical Officer of Health to the City of Birmingham, opened a discussion on "Present Lines of Attack on Tuberculosis: Their Relative Value." He referred to the lure of treatment as compared with prevention and considered the reduction in the number of new cases to be of far more importance than the discovery of any panacea for the cure of the disease. He also drew attention to the great decline in mortality from tuberculosis and said one might draw a line from the mortality-rate figure for 1856 to the present year and find that such a straight line covered nearly every intervening year with but few exceptions. He considered that compulsory education, dating from 1870, has had a more profound influence directly and indirectly in reducing the incidence and mortality from tuberculosis than the discovery of the tubercle bacillus and the subsequent methods of immunization or the establishment of anti-tuberculosis schemes. Education has made people take advantage of the progress of hygiene of the past half-century, and taskmasters by reason of better education have had to modify conditions of employment. Better general education is needed so that a community may become capable of grasping

the meaning and value of knowledge directed to such a special subject as healthy living. Special education in the prevention of tuberculosis is needed. The anti-tuberculosis dispensary as a means of spreading knowledge is probably the most important means we have in our campaign against tuberculosis.

Lieut.-Colonel F. E. Fremantle commented on the high and somewhat uniform rate of mortality from tuberculosis among males from 25 to 55 years, whereas in females the mortality-rate comes steadily down during that time. The female is mainly at home, and the male is mainly out of his home in the factories and workshops and offices. Is it a question of infection, or is it one of strain? The strain on the woman in her housework is probably not less than that on the man in his work at large. He regarded the difference mainly to represent the infectiveness of the disease. In the greater world the male is constantly meeting with an infinitely wider sphere of infection—perhaps the source of infection is not primarily in the home. He advocated periodical medical inspection of individuals with a view to finding out earliest cases of tuberculosis—thus defining and arresting the amount of infection.

Mr. G. Price Hemsworth said education in the direction of using wages was a very valuable thing, but working people through economic conditions were often unable to follow up prescriptions.

At the afternoon session the subject for discussion was "Housing: Home Conditions." In the absence through illness of Professor Kenwood, Dr. A. M. Hewat, Senior Medical Officer to the L.C.C., read the Professor's paper. Professor Kenwood, in visiting notified cases in the Borough of Stoke Newington, had been impressed with two facts: the notifications mostly came too late, and it was often impossible to secure such satisfactory home and living conditions as would be likely to provide a really useful measure of protection against any extension of the disease in the home, especially when young children were present. The boarding-out of children who are at risk in infected homes was, he thought, an important preventive measure. After-care work should be carried out by suitably trained whole-time officials. A detailed national scheme of after-care should be framed and enforced.

Sir William Younger, Bart., deplored the undoing of the splendid work done by staffs of sanatoria owing to defects in after-care. He stressed the unwisdom of patients having to return from sanatoria to unhygienic homes. He advocated—in the case of children—convalescent homes, under the same authority as the sanatorium for completion of convalescence and education of mothers as to their responsibilities.

Dr. Moore, Medical Officer of Health for Huddersfield, said that, relative to tuberculosis, the housing problem was not so important as the conduct and character of the occupants. He thought it would be safe to say that the percentage reduction in the tuberculosis death-

rate (referring to the charts shown by Sir John Robertson) is equalled by the percentage reduction in the general death-rate, and that during the latter half of last century a curve showing the price of wheat (an index of the price of living) would show a fall strictly comparable to the fall in the death-rate from tuberculosis in that period—in other words, nutrition has a great deal to do with immunity in tuberculosis.

Dr. F. J. H. Coutts, of the Ministry of Health, said that tuberculosis, from the point of mortality statistics, was very largely an index disease, and that the reduction of mortality from tuberculosis could not be attributed to one or even two single items, either individual action or legislation, but to general sanitary improvement, taken in a very wide sense indeed. In that general sanitary improvement the education of the public was an important factor. The increase in tuberculosis during the war was probably due to two causes, mainly nutrition and secondly over-strain.

On Friday, July 1, the chairman was the Right Hon. H. J. Tennant, Treasurer of the Association. Professor E. L. Collis opened a discussion on "Housing and Industrial Conditions." He said tuberculosis was an infection regarded, among civilized nations, as endemic and ubiquitous, and that its ravages represented the existence of low physiological resistance. Malnutrition was a factor ruling mortality from the disease in early adult life and was—as far as tuberculosis was concerned—of far greater importance than unhygienic environment. Malnutrition implied decreased physiological resistance to the disease. This ubiquitous endemic infection in infancy carried off those who had inherited no resisting power; in early adult life it carried off those whose resisting power was lowered either by impaired digestive powers or by a dietary inadequate for their needs; in middle age it carried off those for whom the wear and tear of early adult life had been heavy. Conditions of adult life which lowered resistance, and particularly resistance to pulmonary diseases, predisposed to tuberculosis in middle age; of these conditions an exaggerated example was exposure to the inhalation of silica dust. The factor of infection was found dominating the predisposing factors of malnutrition and wear and tear. Control of an infectious disease could only be acquired by controlling exposure to infection. Sir Thomas Oliver said that overcrowding was not only a cause of the spread of tuberculosis, it also explained that high infantile mortality from intestinal and other conditions.

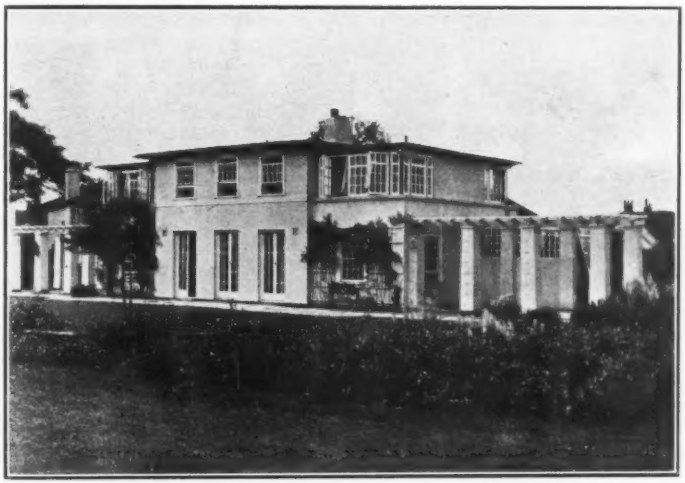
On the afternoon of Friday, July 1, and on the morning of Saturday, July 2, visits were arranged to various institutions and housing schemes —the Housing Schemes of Hammersmith, Welwyn and Letchworth Garden Cities, Preston Hall Colony and Burrow Hill Colony.

Over 350 delegates from all parts of the country attended the Conference.

ASSOCIATIONS AND INSTITUTIONS.

ITALIAN VILLA, WELWYN GARDEN CITY.

Dr. C. H. B. Booth has adapted a house at Welwyn Garden City in Hertfordshire for the care and treatment of early cases of tuberculosis. The patients' sleeping accommodation is provided on covered-in balconies, the window space of which has been arranged so as to ensure an ample supply of fresh air. Electric lighting and heating is available throughout the house. The numbers of cases taken are



ITALIAN VILLA, WELWYN GARDEN CITY.

strictly limited, and every patient is assured of individual attention. The situation is extremely healthy, and within easy access of London. Dr. Booth has himself been a sanatorium patient, and since the arrest of his trouble has acted as Medical Officer to a Sanatorium. His object is to provide for his patients every home comfort, without any of the essentials of a thorough Sanatorium routine being omitted. Full particulars may be obtained on application.

NOTICES OF BOOKS.

PHTHISIOLOGY AND THE UPPER RESPIRATORY PASSAGES.

Dr. Didier of Lille has recently published a small volume which is to be recommended to those whose responsibilities include the diagnosis and treatment of the tuberculous.[1] It usefully ventilates an issue of primary importance in the need for recognition and treatment of rhinopathic conditions in a large proportion of those suffering from tuberculous and non-tuberculous chest conditions. This phase of the subject is discussed in the first two chapters. The author quotes Flurin, who holds that one type of bronchitis, "rhino-bronchitis," is dependent for its development upon septic secretions gravitating from the upper respiratory area, thus infecting the lower. Parrel describes a neuro-arthritic defect which may cause a total dystrophy of the respiratory tree. The question of pseudo-tuberculous conditions of the lungs, secondary to rhinopathic lesions, is discussed, and the development of the classical symptoms of tuberculosis, such as emanciation, evening pyrexia, anæmia, cough, adenitis, apparent hæmoptysis, dyspepsia, is claimed as possibly referable and secondary to lesions of the upper passages. Tuberculous infection by inhalation is regarded as of great frequency, but again due to abnormal conditions of the nasal mucosa, which is rendered ineffective as a barrier and protective agency. The importance of a thorough examination of the upper respiratory region is a natural corollary, with adequate treatment of any pathological conditions found. This is of especial necessity when dealing with children admitted into preventoria or under observation at clinics. In a later chapter the researches of Sergent and Rist obtain reference. The former examined 600 soldiers suspected of tuberculosis and found 89 non-tuberculous but most of whom had defects in their upper passages. Rist, examining 167 pensioners and invalids for tuberculosis, isolated 63 with chronic naso-pharyngeal catarrh. It is not stated however, whether treatment of the rhinological lesions was successful in restoring the non-tuberculous to health, nor are the after-histories given; it must be realized that tuberculosis may remain dormant and non-overt for considerable periods only to become eventually reactivated and the definite cause of previous anomalous symptoms. As regards the tuberculous, figures indicating that over 40 per cent. have rhinopathic lesions are quoted. Agreement in the main will be conceded to the chief thesis of the author, and the small volume should form a useful addendum to the literature of the subject.

G. Basil Price, C.M.G., M.D., F.R.C.P.

[1] "Les Voies Respiratoires Supérieures dans Leurs Rapports avec la Phtisiologie." Par le Docteur Georges Didier. Laryngologiste du dispensaire de Marillac (Lille). Préface du Docteur Georges Laurens, Oto-Rhino-Laryngologiste de l'Hôpital Saint-Joseph. Pp. 80. Paris: Libraire Octave Doin, Gaston Doin et Cie, 8, Place de l'Odéon. 1927. Price 10 fr.

TUBERCULIN AND ANTIGENOTHERAPY.

By this time, it would seem, we should possess definite knowledge of the value, if any, of tuberculin. Many clinicians of wide experience are, however, still more than sceptical regarding it. Nevertheless, new and original preparations reappear with claims reminding one of Don Quixote's paper helmet of improved design. The list of tuberculins and sera that have had a great though ephemeral vogue is growing formidable. The evidence of efficacy given in the volume recently issued by Drs. Négre and Boquet has a very familiar ring about it.[1] Professor Calmette's foreword is so favourable and so full of promise that it almost tempts one to try tuberculin all over again. The preparation specially advocated is a methylic extract of tubercle bacilli previously treated by acetone. Of it Calmette writes: "The experimental study of this antigen on animals injected with tubercle bacilli has shown that it is almost without toxicity, that it provokes, even in large doses, no focal or general reaction . . . and yet promotes in tuberculous subjects large quantities of antibody." Its special property, however, he goes on to say, and that to which it owes its favourable effects, is its power to promote a fibrous organization of peri-tuberculous tissues and to hinder the spread of bacilli by a sort of intracellular coagulation. The authors claim that the antigen causes the retrogression or cure of cutaneous, glandular, bony, joint, and peritoneal tuberculous lesions. Of its action in pulmonary tuberculosis they speak with more caution. The same kind of thing has been written concerning practically all of the numberless cures for tuberculosis. This fact makes it very hard to assess the value of this volume. If it can be established that in this methylic extract we have an antigen which is potent to produce antibodies *which have a favourable effect on tuberculous lesions*, at the same time causing no dangerous or unpleasant reactions, then it is indeed worthy of a full trial. The pity is that clinical and laboratory research cannot be associated more closely and for far longer periods. There is today too great a compulsion to produce published work. "What has the man written?" is the cry. Thus we are inundated with immature work, and with difficulty we keep our heads above the rising tides. In assessing the value of any treatment of tuberculosis we must remember, while we are applying it, that there still exists the *vis medicatrix naturæ*. Of the sincerity of the book there is not the least doubt.

F. G. CHANDLER, M.D., F.R.C.P.

ACTINOTHERAPY.

Dr. H. G. Falkner has provided a concise, practical handbook on artificial light treatment which admirably meets the needs of busy general practitioners.[2] Information is presented in lucid form, and as far as possible without elaborate technical explanations, regarding the essentials of ultra-violet rays, their production, action, and uses.

[1] "Antigénothérapie de la Tuberculose par les Extraits Méthyliques de Bacilles de Koch." Par L. Négre et A. Boquet, chefs de laboratoire à l'Institut Pasteur. Préface du Professeur A. Calmette. Pp. 158, avec 2 planches. Paris: Masson et Cie. 1927. Prix 16 fr.

[2] "Actinotherapy for General Practitioners," by H. G. Falkner, L.R.C.S.I., L.R.C.P.I., L.M. Rot. Dub., O.B.E., Actinotherapeutist to the London Teachers' Association. Pp. x+152, with 36 figs. London: Baillière, Tindall and Cox. 1927. Price 7s. 6d.

Serviceable descriptions, effectively illustrated, are given of the various lamps suitable for employment in general practice. Dr. Falkner does well to warn against the adoption of actinotherapy as a home measure unless under expert medical supervision, and with a skilled attendant directing. The descriptions and illustrations of apparatus and spectra will be particularly helpful. The chapter on technique, with its judicious collection of "Don'ts," is excellent. There are various chapters dealing with actinotherapy in systematic diseases. One chapter is devoted to tuberculosis and lupus. The author rightly points out that great caution must be exercised in employing actinotherapy for cases of lung tuberculosis. The volume closes with an alphabetical summary of diseases, with suggestions for dealing with them appropriately by actinotherapeutic measures.

TUBERCULOSIS IN CHILDHOOD.

Dr. Péhu and Prof. Dufourt of Lyons have written a comprehensive treatise which sets forth in attractive form the essentials of French opinion regarding the modes of origin and evolution of pulmonary and generalized forms of tuberculosis in the child.[1] The problem is effectively presented in its clinical and pathological aspects. Within the limits of a short review it is out of the question to embark on a discussion of the many views expressed in this enlightening symposium, but it may be of interest to quote the following extracts which represent the authors' personal opinions: that 5 to 20 per cent. of cases of infantile tuberculosis are of bovine origin; that pulmonary tuberculosis, whilst rarely of human or bovine intestinal origin, is almost entirely of human respiratory origin; that pure or dominant abdominal tuberculosis is almost constantly of intestinal human or bovine origin, in almost equal proportions; that, in a contaminated environment, infection by way of decayed teeth appears possible; that syphilis and tuberculosis have few pathological associations; that the most frequent portal of entry of the latent bacillus is through the broncho-pulmonary system, an intra-pulmonary primitive nodule being formed coincidently with damage to the lymphatic system. The book can be commended as a useful work of reference. The views of numerous authors, mostly French, are quoted on each page, and a copious bibliography is also appended. The book is printed on leaded paper throughout, and is, therefore, very heavy to carry. But little attempt at summarization has been made. It is unfortunate that there is no index.

J. F. Halls Dally, M.D., M.R.C.P.

TUBERCULOSIS AND OCCUPATION THERAPY.

In the management of tuberculous cases occupation therapy now occupies a prominent place. Two American doctors have recently issued a suggestive work on the subject.[2] Though published in America,

[1] "La Tuberculose Médicale de l'Enfance" By Dr. M. Péhu and Prof. André Dufourt. Pp. 732, including bibliography and analysis of contents, with 30 radiograms. Paris: Gaston Doin and Co., 1927. Price 75 fr. net.

[2] "Advising the Tuberculous about Employment." By W. J. Hamilton and T. B. Kidner. Pp. lx+171. Baltimore, U.S.A.: The Williams and Wilkins Company, 1927. Price 9s.

the book has a great many useful points for us in this country. It is written by experts who have a wide knowledge of the subject. One thing they have thoroughly grasped, which is extremely difficult to make many of our workers in tuberculosis realize—namely, the futility of always suggesting to tuberculous patients that they should get a job "in the open air." This is only second to the absurd suggestion that they should secure a light place in the country—advice which, I regret to say, is still given by some tuberculosis officers and others whose luckless patients come my way. It cannot be too strongly emphasized that in most cases the right employment for these people is the one they have been accustomed to all their lives. The book before us is on the right lines in urging this fact upon its readers. The authors very properly point out that no effort should be spared in the endeavour to persuade employers to receive back into employment their workers who have undergone treatment and are arrested cases. One of the difficulties in carrying out this course is the prejudice and fear among fellow-workers. This has naturally arisen from the intensive public campaign against tuberculosis as an infective disease carried on oftentimes by means of lurid pictures dealing mainly with the subject of infection. It is the bad side of a really good and necessary piece of work. But if it is difficult to provide occupation for arrested cases, how much more so is it for those who are not quiescent. For a large proportion of these some sheltered occupation is necessary—that is to say, protection from the stress and strain of unsuitable working conditions, such as competition in ordinary industrial employments. In other words, they will be able to work if they feel safe, and this is where colonies or settlements are so valuable. But to succeed they must not consist of tuberculous patients only, but there must be all sorts and conditions of men and women and children living together in varying healthy employment and surroundings. The great problem of the present moment is how this can best be attained. The little book under review furnishes considerable help in suggesting how it can be brought about.

JANE WALKER, J.P., M.D.

THE SYPHILITIC LUNG.

Dr. R. Benda has written an interesting monograph on chronic syphilitic bronchitis.[1] This difficult subject is dealt with in a careful and suggestive manner. A few rare gross syphilitic lesions in the lung and mediastinum are well recognized. The secondary effects of an aneurism are known. With more subtle changes in the lung parenchyma, interstitial tissue, glands and bronchi, however, the difficulties begin. Changes that were at one time ascribed to syphilis were later thought to be tuberculous or secondary to some acute or sub-acute inflammatory conditions. Bériel, Sergent, de Spangenberg, Patino Mayer, Elizalde, Carrera, Mirande Letulle, and others are quoted as having written on the subject. The author is concerned alone with chronic syphilitic bronchitis. He gives diagrams illustrating

[1] "La Bronchite Chronique Syphilitique: Étude anatomo-radiologique et clinique des scléroses bronchiques et péribronchiques au cours de la syphilis tertiaire du poumon." Par R. Benda, Ancien Interne des Hôpitaux de Paris. Pp. 172. Avec figures et 4 planches. Paris: Gaston Doin et Cie, 8, Place de l'Odeon. 1927. Prix 18 francs.

the difference between syphilitic and tuberculous sclerosis. He claims that syphilis has a predilection for the bronchi, that peribronchial sclerosis involving thickening of the bronchial walls, with possible involvement of the mediastinal glands, is the most common anatomical type. Bronchial dilatation may or may not occur. Syphilitic sclerosis, he asserts, is systematic, large, and abundant, thickens the interlobular spaces, surrounds the lobules with large rings and contains a number of new bloodvessels. Tuberculous sclerosis, on the other hand, is not systematic, it traverses the lobules haphazard, leaving some acini intact and destroying others, does not widen the interlobular spaces, and is poor in new bloodvessels. Unlike syphilis in other parts where all elements are attacked, the author states that in the lungs this disease appears to attack either the vascular elements or the air passages, not both together. Skiagrams are given, but, to my mind, they are not convincing. Figures 4, 5, and 6 appear to have been touched up; the very obvious bronchial circles seen in these skiagrams not appearing to anything like the same extent in Figures 10, 11, and 12, the same cases after Lipiodol injection: but one, of course, recognizes the difficulty in reproducing the finer details of a skiagram. The author discusses the differential diagnosis between chronic bronchitis, sclerosis of the pulmonary artery (d'Ayerza-Arrillaga's disease), and pulmonary conditions secondary to heart failure. In arriving at the cause of the bronchial sclerosis, the author's position appears to be this: Having excluded tuberculosis as far as possible and all other known causes of sclerosis—gout, renal disease, alcoholism, occupation, naso-pharyngeal sepsis, cardiac disease—then if there is evidence of syphilis it is reasonable to assume that the sclerosis is syphilitic and to treat accordingly. Moreover, we should always think of syphilis as a possible cause. There is a judicious and helpful summary of the author's conclusions at the end of the book, and a useful bibliography is provided.

F. G. CHANDLER, M.D., F.R.C.P.

MANUALS FOR MEDICAL ADVISERS AND WORKS OF REFERENCE.

Motoring has proved invaluable to many elderly delicate and tuberculous subjects in providing means whereby an open-air life can be conducted without fatigue or exposure, and with a maximum of psychological benefit and bodily advantage. Practically every doctor owns a car and realizes the advantages connected with motoring, not only in his own professional work, but in assisting patients to regain and maintain health. For tuberculously disposed persons and other health seekers wisely ordered motor touring can be of great service. To all such we commend Mr. Sydney R. Jones' charming little volume on touring in England.[1] It is a collection of descriptions of a score of tours with route sketches, maps, photographs, and dainty drawings. The tours presented have been personally studied, and conduct the motorist into England's green fields, undulating landscapes, picturesque

[1] "Touring England by Road and Byway," by Sydney R. Jones. Pp. xx+140, with twenty-three maps and fifty-four pen drawings by the author, and twenty-two photographic plates. London: B. T. Batsford, Ltd., 94, High Holborn. 1927. Price 7s. 6d.

villages, park lands, and peaceful lanes—an environment for rest, restoration, and refreshment. The work is one which will delight all lovers of England's beauty spots. We hope Mr. Jones will favour us with companion volumes dealing with Scotland, Wales, and Ireland. The book is artistically produced in a form we now expect from the house of Batsford.

The Ministry of Health has recently issued a Report on Acute Rheumatism in Children and its Relation to Heart Disease.[1] Sir George Newman provides a prefatory note in which he shows that the number of children who receive in-patient treatment for acute rheumatism, chorea, and rheumatic carditis is estimated to exceed 2,000 per annum in London alone; and he adds that "for every child who is fortunate enough to be admitted as an in-patient there are two, three, or even four children who need in-patient treatment and who do not get it." The report contains valuable data and interesting suggestions, and clearly indicates our ignorance as to the ætiology of rheumatic infection and means for its prevention.

The Public Health Section of the Annual Report of the London County Council contains statistical data and other information of much interest to Tuberculosis Officers and others interested in the health problems of London.[2] The population of London in the middle of 1926 was estimated at 4,615,400. The marriage-rate was 17·2 per 1,000 and the birth-rate 17·1 per 1,000. The death-rate stood at 11·6 per 1,000. The deaths from tuberculosis of the respiratory system numbered 4,066, a death-rate of 0·88 per 1,000. The number of notifications received in London boroughs amounted to 9,188. Dr. F. N. Kay Menzies provides interesting figures regarding the prevalence of tuberculosis and the increase during recent years in pulmonary tuberculosis among young women. There is a full account of the tuberculosis scheme of the L.C.C. There is a section on open-air education, and particulars are given of the special class for little sufferers with lupus attending the light department of the London Hospital.

The Metropolitan Asylums Board has issued a Tuberculosis Section of its Annual Report.[3] This contains data regarding the work of M.A.B. tuberculosis institutions, together with a number of illustrated contributions by members of the M.A.B. Tuberculosis Service.

The well-known firm of Watson and Sons were responsible for the installation in the new Radiological Department of the Royal Infirmary, opened on October 9, 1926, by the Duke of York. It is the finest institution of its kind in Europe. Messrs. Watson have just issued a descriptive booklet, very beautifully illustrated. Dr. J. M. Woodburn Morison, Lecturer in Radiology in the University of Edinburgh and Radiologist to the Royal Infirmary, provides a detailed report. Messrs.

[1] Reports on Public Health and Medical Subjects, No. 44: "Acute Rheumatism in Children in its Relation to Heart Disease." Pp. xii+99. London: H.M. Stationery Office. 1927. Price 1s. 6d.

[2] London County Council: Annual Report of the Council, 1926. Vol. III.: "Public Health, Including the Report for the Year 1926 of the County Medical Officer of Health and School Medical Officer, Main Drainage and Housing." Pp. 192. London: P. S. King and Son, Ltd., 14, Great Smith Street, Victoria Street, Westminster, S.W. 1. 1927. Price 2s. 6d.

[3] A copy of the Tuberculosis Scheme of the Metropolitan Asylums Board Annual Report for 1926-27, can be obtained from the Offices of the Board, Victoria Embankment, E.C. 4.

Watson have also published an illustrated catalogue giving particulars of the various kinds of lamps now available for actinotherapy.[1]

Messrs. Watson and Sons have recently issued a practical handbook on radium.[2]

Dr. C. Furnodt-Moller, Medical Superintendent of the Union Mission Tuberculosis Sanatorium, Arogyavaram, near Madanapalle, India, has published a brochure on "The Sanocrysin Treatment of Tuberculosis, with Special Reference to Indian Patients."

Doctors, nurses, and others who realize the value of occupation-therapy for their patients should secure the 1928 issue of "Hobbies Annual."[3] It is an illustrated volume containing particulars regarding many forms of artistic handicrafts which will be of interest and prove serviceable in hospital, sanatorium, and open-air school work.

The last Report of the Papworth Village Settlement is an album-like illustrated publication, indicating in pictures and picturesque text the admirable work which is being carried on by Dr. Varrier-Jones and his co-workers at the Cambridgeshire Tuberculosis Colony, the President of which is Sir Humphry Rolleston, Regius Professor of Physic in the University of Cambridge.[4] Everyone interested in the application of occupation-therapy for tuberculous cases should secure a copy of this suggestive record.

The new Report of the Lord Mayor Treloar Hospital and College, Alton, and Hayling Island, Hants, is a document of exceptional interest. It contains a valuable medical report by Sir Henry Gauvain, with particulars regarding the work of the Light Department. The report is effectively illustrated, and also presents a ground plan of the hospital estate at Alton.

Doctors and other busy people who have to make use of our railway systems will be interested in the novel time-table compiled by Lieut.-Colonel W. Mansfield, and issued under the title of "Easifind."[5]

The Swiss Society for Balneology and Climatology has just issued a new illustrated edition of the "Guide to Health Resorts in Switzerland." Dr. Amrein of Arosa has an article on "Climate at High Altitudes"; Dr. Nienhaus of Davos deals with "The Curative Treatment of Tuberculosis at High Altitudes," and Dr. Bernhard of St. Moritz writes on "Sunlight Treatment."[6]

[1] "The New Radiological Department, Royal Infirmary, Edinburgh," and "Artificial Sunlight," being Bulletin No. 80, Supplementary Catalogue, Part III., Section 5, issued by Watson and Sons (Electro-Medical), Ltd., Sunic House, Parker Street, Kingsway, W.C. 2.

[2] A copy of "Radium: Its Production and Therapeutic Application," can be obtained post-free on application to Watson and Sons (Electro-Medical), Ltd., Sunic House, Parker Street, Kingsway, W.C. 2.

[3] "Hobbies Annual" is published by Hobbies, Ltd., Dereham, Norfolk. Price 9d.

[4] The Papworth Village Settlement: Reports of the Committee of Management and Medical Director for 1926.

[5] "Easifind Railway Time-table for England and Wales, and Through Tables for Scotland," compiled by Lieut.-Colonel Mansfield, F.R.C.I., M.I.Mech.I., M Inst.I., for Easifind, Ltd., 409, Brixton Road, S.W. 9, printed by Bemrose and Sons, Ltd., and published by Rolls House Publishing Company, Ltd., 2, Breams Buildings, E.C. 4. Price 2s. each number.

[6] "Health Resorts of Switzerland: Spas, Mineral Waters, Climatic Resorts, and Sanatoria," edited under the auspices of the Swiss Society for Balneology and Climatology, by E. Mory, M.D., H. Keller, M.D., and R. Jaeger, M.D., under the patronage of the Swiss Tourist Office, the Association of Swiss Spas, and the Association of Swiss Hotelkeepers. Third Edition, Pp. vi + 200, with full-page illustrations. Zurich: Julius Wagner, 1927.

PREPARATIONS AND APPLIANCES.

HYGIENIC APPLIANCES AND THERAPEUTIC PREPARATIONS.

Under the designation of "BED-CLOZ-TUK" Mr. Bartter has introduced a novelty which is likely to interest doctors and nurses and all who have the management of bed-fast cases, especially those who are undergoing open-air treatment.[1] Everyone who has experience of bed cases under out-door conditions, whether on the terrace or in the grounds of a sanatorium or elsewhere, knows how troublesome the wind can be in disarranging bed-clothes. Mr. Bartter's ingenious fitting

THE "BED-CLOZ-TUK."

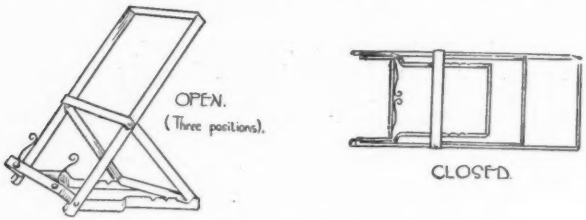
Bed-coverings attachment—open. Bed-coverings attachment—closed.

prevents the untucking and blowing away of bed-coverings. For restless, unconscious patients and for many invalids and children this simple, automatic, self-adjusting fastener will be of considerable service. The chief points of this appliance are indicated in the adjacent illustrations. It is fastened around the iron runner at the side of the bed. By means of fittings sliding through a leather loop and attached at the

[1] Full particulars regarding the "Bed-Cloz-Tuk" can be obtained on application to the inventor, S. H. Bartter, 8, St. James's Road, Kingston-on-Thames.

bottom by a coil spring, considerable flexibility is obtained in whatever direction the clothes are pulled or blown. The action is silent. Non-slip rubber pads automatically hold sheet and blankets. It is easy to adjust the fitting so that the patient is allowed freedom of movement. The price per pair is: for adults, 7s. 9d.; children, 6s. 9d.

THE UTILO READING STAND is a simple, strong, durable, effective metal folding stand, made in oxidized steel and rustless steel, which will prove of much practical service to people of all ages and every



THE UTILO READING STAND.

class.[1] It will be specially appreciated by patients in hospitals and sanatoria, and should be known to all persons who seek to do their reading under open-air conditions. The chief features of this desirable novelty are shown in the accompanying figure.

THE BERGER VAPORIZING LAMP, a French invention, only needs to be used to be appreciated in this country.[2] It provides a novel but scientifically designed means whereby a room rendered foul by stale tobacco smoke or any undesirable emanations can be speedily and effectively deodorized. This cleverly constructed lamp will be a boon in many a sick-room, and will be of special service in apartments where certain types of consumptives, cases of bronchiectasis, and other medical and surgical cases are being nursed. The lamp consists of an artistic glass container, into which is placed perfumed alcohol. Above is a platinized burner, which, after being heated by a single wick for about two minutes, continues to maintain the cone placed directly above the wires and the protecting washer in an incandescent state, so carrying on the vaporization of the perfumed alcohol as long as there is any in the container. The alcohol preparation can be supplied in a variety of pleasing perfumes.

THE BERGER VAPORIZING LAMP.

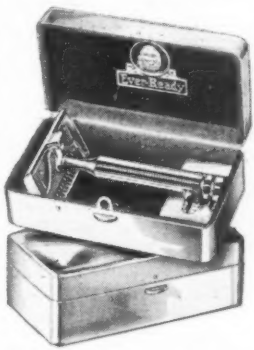
[1] Particulars regarding the Utilo Reading Stands and similar stands suitable for use in hospitals, sanatoria, and nursing homes can be obtained on application to the makers, Claughtons (Leeds), Ltd., Oldfield Lane, Leeds.

[2] Particulars regarding the Berger Vaporizing Lamp can be obtained from the British Concessionaries, Ingenuities (Captain A. O. French-Brewster), 23, Old Bond Street, W. 1. The price of the lamp ranges from 10s. 6d. to 42s., and the perfumed alcohol is supplied at 5s. 6d. a bottle.

The Reliance Rubber Co., Ltd., are manufacturers of a large variety of rubber goods likely to be of special service in hospitals and sanatoria, as well as for patients in their own homes or in nursing centres. Among these we would direct attention to the "First Aid" Local Heat Application RUBBER BOTTLE.[1] It is a miniature hot-water bottle made of good quality cherry-red rubber, and is useful in relieving local pain and discomfort. It forms an excellent ice-bag, and will be useful in dealing with certain forms of hæmorrhage.

THE FIRST-AID RUBBER BOTTLE.

Every consumptive man should shave. This hygienic rule should be explained to all patients. A man with pulmonary tuberculosis expectorating tubercle bacilli in his sputum and wearing a moustache is guilty of a sanitary sin. It is practically impossible to keep a moustache bacteriologically clean; it inevitably collects some sputum, which, if it contains tubercle bacilli, on drying scatters infective dust, so proving a prejudice to the patient himself and a menace to those about him. It would be well if all tuberculosis officers and especially medical superintendents of sanatoria would both by precept and example do their utmost to encourage shaving among all male tuberculous patients. Various inexpensive forms of safety razor are now available. One of the cheapest and most effective is supplied under the name of THE EVER-READY SAFETY RAZOR.[2] It is simple in design, strong in construction, durable, and can be set and used with the greatest ease. It is made of brass, nickel-plated, and is self-adjusting. The handle screws into the frame, which carries the Ever-ready Radio Blade.



THE EVER READY SAFETY RAZOR.

The O-Cedar Products are sanitary preparations having a high hygienic value, and are of much service in institutions dealing with consumptive and other tuberculous cases as well as being useful generally in preventing the accumulation of dust and dirt which are so commonly carriers of the tubercle bacillus. THE O-CEDAR WAXIT will be much approved in establishments where floors have to be maintained highly polished, for by means of this novelty it is a simple matter to polish any waxed floor surface.[3] Like the O-Cedar Mop, the O-Cedar Waxit is a time and labour saver. To use it is to approve it.

[1] The "First Aid" Local Heat Application Bottle is made by the Reliance Rubber Co., Ltd., Formosa Street and Amberley Road, Paddington, W. 9. Price 5s. 3d.

[2] The Ever-Ready Safety Razor is supplied by the British-American Safety Razor Co., Ltd., 3, Woodstock Street, Oxford Street, W. 1. Price complete in strong nickel case, 2s. 6d. (with packet of five blades extra).

[3] Particulars regarding O-Cedar Waxit and other preparations for hospital and sanatoria use can be obtained on application to O-Cedar, Ltd., Slough, Bucks.

Under the designation of QUEENETTY there has recently been introduced a sanitary appliance which will be of special service to women undergoing open-air treatment in sanatoria, engaged in active life, or travelling.[1] This hygienic supplement to the ordinary sanitary towel is an ingenious protective. It is constructed of celluloid, is adjusted by means of elastic straps, and fitted with absorbent gauze pads. The combined weight is under 3 ounces.

A series of NASAL CREAMS is now being provided by Messrs. Duncan Flockhart and Co., which will prove serviceable in dealing with morbid conditions involving the naso-pharynx.[2] Among the preparations already available are alkaline, antiseptic, astringent, iodized, sedative, and stimulant forms. Each medicated cream is enclosed in an elastic gelatine capsule, the ejector nozzle of which is an integral part of the capsule. These nasal creams will be of service in dealing with some of the common nasal disorders frequently met with in tuberculous subjects.

A colloidal antimony can now be obtained from the Crookes Laboratory for those who desire to test its action in tuberculous cases according to the method advocated by Dr. Percy Moxey.[3]

Many consumptives and other tuberculous subjects are confirmed cigarette smokers, and to withdraw tobacco from these and other chest cases would in many instances produce psychological states which would be generally prejudicial to the happiness and physical welfare of the patient. In most sanatoria smoking is permitted under regulated medical supervision. It is essential, however, that the doctor should control the smoking habits of his patients. The well-known firm of Martin's is providing reliable "Non-throat" Cigarettes which both doctors and patients can approve.[4] These attractive-looking, cork-tipped cigarettes are made of a special blend, long ago discovered, of particularly pure and mild tobaccos. They are not medicated, do not irritate the mucous membrane of the respiratory passages, and possess a delicious flavour. The size is 3 inches long and about $\frac{3}{8}$ inch diameter.

[1] Details regarding the Queenetty speciality can be obtained on application to the Queenelty Co., 134, Cheapside, E.C. 4. The price is 12s. 6d. and 10s. 6d. per pair.

[2] Particulars regarding the Nasal Cream Capsules can be obtained from Duncan, Flockhart and Co., Edinburgh, and 155-157, Farringdon Road, E.C. 1.

[3] Collosol Antimony is prepared by British Colloids, Ltd., at the Crookes Laboratories, 22, Chenies Street, Tottenham Court Road, W.C. 1. Dr. Percy Moxey, Clinical Tuberculosis Officer and Deputy Medical Officer of Health for the Port and Borough of Southampton, published his Paper, "Treatment of Tuberculosis: A note on the Effect of Colloidal Antimony," in the *British Medical Journal*, February 26, 1927, pp. 374.

[4] Full particulars regarding the "Non-throat" Cigarettes may be obtained on application to Martin's at 210, Piccadilly, W. 1, or their General Offices, 54, Sussex Place, South Kensington, S.W. 7.

THE OUTLOOK.

TUBERCULOSIS AND THE MINISTRY OF HEALTH.

SIR GEORGE NEWMAN'S recently issued Annual Report contains matter of special interest to all interested in the tuberculosis problem.[1] The new cases of tuberculosis in 1926 for England and Wales numbered 79,654—59,520 pulmonary and 20,134 non-pulmonary. The deaths from all forms of tuberculosis amounted to 37,525—respiratory system 30,108 and other forms 7,417. There are 367 approved Tuberculosis Officers and 482 residential institutions providing 22,202 beds. The dispensaries number 442. Descriptions are given of the Cambridgeshire Tuberculosis Colony at Papworth and the British Legion Village Settlement and Training Colony at Preston Hall. An important section is devoted to a consideration of training and employment, and reference is made to schemes already in existence. The descriptions of methods of treatment are of special interest, and include particulars regarding gold thiosulphate, known as "sanocrysin," the Spahlinger treatment, immunization by Professor Calmette's method, and the use of X rays. With regard to the latter the following statement appears: "The main use of X rays in tuberculosis is for the purposes of diagnosis and in connection with the examination and observation of cases selected for treatment by artificial pneumothorax. It has also been used in the treatment of tuberculous adenitis and of lupus. The results in the former disease have not been wholly encouraging, whilst the application of the rays to lupus involves the risk of carcinoma supervening in the treated area. With the advent of increased facilities for the artificial light treatment of lupus, there should be no need for utilizing X rays in the treatment of this disease." Sections are devoted to a consideration of the much criticized Memorandum 37/T, and the view is expressed that "the examination of the returns already furnished indicate that they will be most valuable in giving a general view of the tuberculosis work carried out by Local Authorities and in giving summary figures for important items of information." The Report contains an important statement respecting the sampling of milk for tubercle bacilli. In the chapter devoted to Medical Intelligence and Environmental Hygiene appears a section on Artificial Light Treatment. A statistical return is provided regarding centres established by local authorities and voluntary agencies. The following note directs attention to the necessity for medical control and supervision in all forms of actinotherapy: "Artificial light treatment is a therapeutic measure which should only be carried out at a clinic or hospital properly staffed and equipped for treatment, and it should only be given to patients suffering from some definite disease or defect—*e.g.*, rickets or marasmus. A minority of workers contend that all

[1] "On the State of the Public Health." Annual Report of the Chief Medical Officer of the Ministry of Health for the Year 1926. Pp. 281. London: H.M. Stationery Office. 1927. Price 3s.

persons, no matter how good their environmental condition and although they may be nominally healthy, are the better for exposure to the ultra-violet rays of the spectrum. But we know as yet too little of the immediate and remote effects of light treatment to accept this opinion without further evidence. It has been already found that some patients, especially children, are constitutionally unfitted for the treatment, and suffer from headaches, tachycardia, nausea, and malaise as the result of artificial light applications." Later appears the very definite warning that "the indiscriminate use of ultra-violet rays by the public must be deprecated," and a reference is made to the important report of the Council on Physical Therapy of the American Medical Association. Sir George Newman's reports are not only informing but stimulating, and there is always much that is encouraging. We conclude this necessarily short notice by reproducing the closing sentences of the Report: "The science and art of preventive medicine is extending in almost all directions; knowledge of it is becoming more applicable and effective; and public opinion is supporting the cultivation of health and fitness in the individual. There is more willingness to live in the open air and take recreative exercise; more sensible views prevail as to food and clothing; sobriety is increasing; industry is safeguarded from many of its former dangers; the housing of the people is steadily improving; and, most effective of all, the value of education is being more generally appreciated. These changes indicate an immense awakening and a wider use of the improved environment and health facilities which the State has provided. Much disease and impairment remain, but evidence and experience suggest that we are on the highroad to their amelioration."

The last Annual Report of the Ministry of Health also contains statistical and other data relating to tuberculosis.[1] It is shown that the number of approved beds in institutions provided by Local Authorities increased by 624 during the year, and in addition more than 700 beds are in course of provision at such institutions. The total number of beds in residential institutions approved by the Ministry for the treatment of tuberculous cases in England has increased by 779. Installations for treatment by artificial light have been approved at thirty-six approved residential institutions and at eleven tuberculosis dispensaries, and arrangements have also been approved for this treatment to be given to certain classes of cases of tuberculosis at thirty other institutions, including twenty-three general hospitals. It is interesting to note that Local Authorities have been informed that in the view of the Ministry and of the Board of Education, "pre-tuberculous" children (*i.e.*, delicate children who on account of their family history or environment might be thought to be predisposed to tuberculosis, but have not been definitely diagnosed as suffering from the disease or suspected to be actually so suffering) should be dealt with by the Local Education Authorities at open-air schools certified by the Board of Education under Part V. of the Education Act, 1921, and not in sanatoria provided by the Public Health Authorities under their tuberculosis schemes. As regards financial expenditure, an outlay of £2,696,112 has been sanctioned up to March 31, 1927. The loans sanctioned amounted to £351,096, and included £143,000 in respect

[1] Eighth Annual Report of the Ministry of Health, 1926-1927. Pp. xxxii+284. London: H.M. Stationery Office. 1927. Price 5s.

of provision by the Surrey County Council of a sanatorium at Milford. The average number of occupied beds in institutions provided by Local Authorities was 11,969, and of beds maintained by those Authorities in institutions provided by voluntary bodies was 5,854; the total of 17,823 being 937 in excess of the average number during 1924-1925. The average cost per patient per week amounted to £2 9s. 2½d. The decline in the number of deaths from pulmonary tuberculosis in 1926, when compared with the figures for the previous six years, is noteworthy. The number of deaths from all forms of tuberculosis, which exceeded 1,000 per week in 1915, was less than 730 per week in 1926. Over a period of twelve years the number of deaths from pulmonary tuberculosis has decreased by more than 25 per cent., and from non-pulmonary tuberculosis by more than 45 per cent. Taking the estimated civilian population of England and Wales in 1915 and 1926 respectively, it appears that the death-rate per 100,000 population from all forms of tuberculosis declined during this period of twelve years from 153 to 96, from pulmonary tuberculosis from 115 to 77, and from non-pulmonary tuberculosis from 38 to 19. A special chapter is devoted to the returns of the Welsh Board of Health, and here a section is devoted to tuberculosis giving statistical data, and records regarding the work of the King Edward VII. Welsh National Memorial Association, which undertakes the provision of treatment of tuberculous cases in Wales.

TUBERCULINS.

In the new Statutory Rules and Orders, 1927, No. 486,[1] which came into operation on August 6, 1927, there is a schedule, part of which is devoted to *Tuberculins*. This section is of such practical importance that we reproduce it here: 1. (1) Tuberculins are preparations of fluid media on which the *B. tuberculosis* has been grown in artificial culture, and which have been freed by filtration from the bacilli. (2) For the purposes of this schedule, tuberculins are classified in two groups: (*a*) Old Tuberculin, and (*b*) Tuberculin Bouillon Filtrate. 2. (1) Old Tuberculin is the concentrated filtrate from the growth of *B. tuberculosis* on a suitable nutrient broth. For its preparation the bacillus must be grown at approximately 37° C. for a period usually not less than six weeks, sufficient to allow the surface of the fluid medium to become covered by a thick growth of the bacillus. At the end of this period the fluid medium, from which the bacilli may or may not have been previously separated by filtration, must be concentrated by evaporation to one-tenth of its original volume, and then filtered. If the required test for potency shows that the preparation so concentrated is more potent than the standard preparation, the potency may be reduced to the required degree by appropriate dilution. If the test shows that the potency is less than that of the standard preparation, it shall not be increased by further evaporation. The proper name of the preparation is "Old Tuberculin," with or without a suffix, such as T. or P.T. The suffix T., if used, must be used to indicate that the bacillus used in preparing the tuberculin

[1] "Therapeutic Substances Regulations." Published by H.M Stationery Office. 1927. Price 9d.

was obtained from a case of human infection; and the suffix P.T. to indicate that the bacillus used was obtained from a case of bovine infection. (2) The standard preparation of Old Tuberculin is a quantity of Old Tuberculin kept in the National Institute for Medical Research, Hampstead. (3) Each batch of Old Tuberculin shall be tested for potency by observation of its specific toxity for guinea-pigs or other animals infected with the *B. tuberculosis*. The test shall be made by a method approved by the licensing authority, and shall be such that the potency of the preparation under test is measured by comparison with that of the standard preparation. Old Tuberculin shall not be issued if its activity differs from that of the standard preparation to such an extent that the difference is revealed by the test. (4) Each batch of Old Tuberculin shall be tested for the absence of non-specific toxity by the subcutaneous injection of 0·5 c.c. into a normal guinea-pig, and shall be treated as having passed the test if such injection does not cause death or serious symptoms. 3. (1) Tubercular Bouillon Filtrate is the unconcentrated filtrate from the growth of *B. tuberculosis* on a suitable nutrient broth. For its preparation the bacillus must be grown at approximately 37° C. for a period usually not less than six weeks, sufficient to allow the surface of the fluid medium to become covered by a thick growth of the bacillus. At the end of this period the medium is freed from bacilli by filtration through a bacteria-proof filter. The proper name of the preparation is "Tuberculin Bouillon Filtrate," with or without a suffix, such as T.O.A. or P.T.O. The suffix T.O.A., if used, must be used to indicate that the bacillus used in preparing the Tuberculin Bouillon Filtrate was obtained from a case of human infection; and the suffix P.T.O. to indicate that the bacillus used was obtained from a case of bovine infection. (2) Each batch of Tuberculin Bouillon Filtrate shall be tested for the absence of non-specific toxity by the subcutaneous injection of 5 c.c. into a normal guinea-pig, and shall be treated as having passed the test if such injection does not cause death or serious symptoms. 4. All tuberculins shall be tested for sterility in accordance with Articles 14 to 18 of Part IV. of the General Regulations. Tuberculin Bouillon Filtrate shall be tested in addition for absence of living tubercle bacilli by a method satisfactory to the authority. With regard to *Tubercle Vaccines* the following statements appear: 5. Tubercle vaccines are preparations made from the bacillary substance obtained by growth of the *B. tuberculosis* on artificial media, and consisting of suspensions of the killed organisms, or of products therefrom, in water or other suitable suspending fluids. The proper name is "Tubercle Vaccine," and any other descriptive title or symbol indicating the origin of the bacilli or the nature of the process of preparation must be used in addition to, and not in substitution for, the name "Tubercle Vaccine." 6. The provisions of Part I. (A) of the second schedule to these Regulations (which relates to the production of bacterial vaccines) shall apply to the production of tubercle vaccines. Part III. sets out the provisions applicable to the production of all sera from living animals; the condition and housing of the animals; the staff of the establishment; precautions to be observed in the preparation of sera; procedure in the case of unhealthy or infected animals.

THE TREATMENT OF TUBERCULOSIS BY ARTIFICIAL LIGHT.

A special report on "The Treatment of Tuberculosis by Artificial Light" has recently been prepared by Dr. G. Lissant Cox, Central Tuberculosis Officer to the Lancashire County Council. This official publication merits the careful consideration of all interested in the application of actinotherapy for tuberculous cases. Particulars, including data on financial expenditure, are given respecting experimental light centres established in 1925 at Ashton-under-Lyne and Lancaster. Dr. Cox, in summarizing the results obtained, claims that artificial light treatment for cases of non-pulmonary tuberculosis has given very good results in two groups of cases—namely, (1) lupus, and (2) adenitis, with abscess formation and skin involvement. The results of treatment of other types of cases—*e.g.*, tuberculosis of bones and joints, adenitis (without softening, etc.)—have also been satisfactory, although the proof of the efficiency of light treatment is not so striking, because those cases also respond fairly satisfactorily to other forms of treatment. Very few cases of pulmonary tuberculosis have been treated. It would seem that no general rule can be laid down as to how particular persons will react to the light, as the response to the treatment varies within very wide limits. It is strongly emphasized that each patient must receive individual treatment and attention so far as initial exposure and graduation of exposure is concerned. In every case a test exposure should be made before beginning treatment, in order to ascertain sensitivity of the skin. Finally, it is stated that no permanent ill-effect, either local or general, has been caused by artificial light treatment, and no patient treated by light has relapsed.

A MEDICAL TOUR TO SWISS TUBERCULOSIS STATIONS.

Many readers of this journal will doubtless desire to participate in the medical tour to Swiss Tuberculosis Stations which is to take place at Christmastide. The Council of the Royal Institute of Public Health, with a view to facilitating the study of the treatment of tuberculosis under the special climatic conditions of Switzerland, have arranged with Alpine Sports, Ltd., to carry out a tour during the Christmas holidays in which visits will be made to the principal stations for the treatment of tuberculosis in that country. Members of the party will leave London on Sunday, December 18, and first visit the great educational centre of Zurich, the Municipal and University authorities of which have already intimated their desire to provide a cordial welcome. Monday will be spent in visiting the Hospitals and the University. The journey will be resumed on Tuesday afternoon, December 20. Wednesday, December 21, will be spent at Arosa, the highest health resort in Switzerland, where a public luncheon will be provided. Thursday, December 22, and Friday, December 23, will be devoted to Davos, which is the oldest of the special tuberculosis stations in Switzerland. At Davos the members will be entertained by the Kurverein. From Davos the party will proceed to St. Moritz, and thence to Maloja, two important winter sports centres, where four days will be spent seeing something of ski-ing, skating, curling,

tobogganing, and sleighing. On Tuesday, December 27, the party will drive into Italy to reach the Rhone Valley, spending the night in Milan, with time on Wednesday morning, December 28, to see the Cathedral and the Brera Gallery. Returning to Switzerland two nights will be spent at Montana in the Rhone Valley, as the guests of Sir Henry Lunn. This resort has been developed by Sir Henry Lunn as a purely English institution, and he has placed some thousands of pounds at the disposal of an English Committee for the special treatment of medical practitioners suffering from tuberculosis. Montana possesses the largest amount of sunshine of any health resort in Switzerland. A visit to Dr. Rollier's world-famous clinics at Leysin for the treatment of surgical cases of tuberculosis will conclude the tour on December 30. Members are invited by Dr. Rollier to spend the night at Leysin, and will then leave for Paris, or may spend any time they wish at one of the sporting or health centres, returning to England as they desire from Leysin or from one of the stations on the line of route within the validity of their tickets (thirty days). The inclusive cost of the tour will be £23 5s., second-class rail; and £28 10s. first-class rail. The accommodation in the hotels will be absolutely first-class throughout. The cost of the tour as specified may be somewhat reduced by special arrangements which are being made with the railway companies in Switzerland. Such, if carried through, will only apply to actual members of the medical profession, and the price will be as above for any relatives and friends who may wish to accompany them. Further particulars may be obtained on application to the Hon. Secretaries, Royal Institute of Public Health, 37, Russell Square, W.C. 1.

NOTES AND RECORDS.

Many readers of this journal interested in the study of medico-sociological subjects will doubtless be glad to avail themselves of the free public lectures on "The Health of the Nation" which are to be given on Wednesday afternoons at 4 p.m. at the Royal Institute of Public Health, 37, Russell Square, W.C. 1. The programme is as follows: October 12, "Sunlight for Childhood," by Dr. C. W. Saleeby; October 19, "Tuberculosis as a Social Disease," by Professor S. Lyle Cummins; October 26, "Some Diseases conveyed to Man from Animals," by Professor Frederick T. G. Hobday; November 2, "Tuberculosis as a Problem of Childhood," by Sir Henry Gauvain; November 9, "The Present Situation in Regard to Housing, by Lieut.-Colonel F. E. Fremantle; November 16, "The Milk Supply—What shall our Policy be," by Dr. R. Stenhouse Williams; November 23, "The Prevention of Heart Disease," by Dr. A Dingwall Fordyce; November 30, "The Prevention of Cancer," by Professor Blair Bell; December 7, "The Health of the Public School Boy," by Dr. L. R. Lempriere; December 14, "The Changed Conditions of Quarantine," by Professor E. W. Hope.

A course of sixteen lectures on tuberculosis for trained nurses, health visitors and social workers will be held at the Hospital for Consumption and Diseases of the Chest, Brompton, S.W. 3, beginning on October 11.

A meeting will be held under the auspices of Radcliffe Infirmary Post-Graduate Course on October 14, at 3 p.m., at the Radcliffe

Infirmary, Oxford, when Dr. J. Gravesen, Medical Superintendent of Vejlefjord Sanatorium, Denmark, will speak on "The Modern Treatment of Pulmonary Tuberculosis," and show lantern slides.

The Society of Superintendents of Tuberculosis Institutions, Hon. Secretary and Treasurer of which is Dr. J. R. Dingley, of Darvell Hall Sanatorium, Robertsbridge, Sussex, will hold its next meeting on October 21, when Dr. Dunham of America will give an address on "Various Types of Tuberculosis Lesions as Seen in the X-ray Plate of the Child and the Adult."

Dr. P. C. Varrier-Jones will deliver the Mitchell Lecture at the Royal College of Physicians on November 15 at 5 p.m., the subject being: "Village Settlements for the Tuberculous."

The First International Exhibition and Conference on Light and Heat in Medicine, Surgery and Hygiene will be held under the auspices of The Actinic Press in the Central Hall, Westminster, S.W. 1, on December 13 to 16. Particulars from the Exhibition Offices, 46, Strand, W.C. 2.

The Medical Officer, founded in 1908, has just issued its thousandth number, and we warmly congratulate the Editor and his staff on the success of this much-valued weekly journal. The column on tuberculosis is a feature which many medicals engaged in tuberculosis work have for long greatly appreciated.

The October issue of *The Prescriber* is a twenty-first birthday number, and we congratulate Dr. Thomas Stephenson and his collaborators on the remarkable success of this admirable monthly record of medical progress. The current issue contains a serviceable section on tuberculosis.

The Journal of Clinical Research for July contained a practical article on "Artificial Light Therapy," by Dr. J. F. Carter Braine.[1]

Dr. Alfred S. Gubb, of Mustapha-Supérieur, Algiers, has issued a new edition of his serviceable brochure on "Algiers and Algeria as a Winter Resort." Doctors sending patients to Algiers should read this helpful little work.[2]

Dr. R. King Brown, Medical Officer of Health of Bermondsey, has accepted the appointment of medical editor of *The British Journal of Actinotherapy* (Oswaldestre House, Norfolk Street, W.C. 2).

[1] *The Journal of Clinical Research* is the official organ of the Clinical Research Association, Ltd., Watergate House, York Buildings, Adelphi, W.C. 2. Price 1s. each number.

[2] "From Cloud to Sunshine," by Alfred S. Gubb, M.D. Tenth Edition. Pp. 109, with map and illustrations. Algiers: Imprimerie Algérienne, 2, Rue Bourbon. 1927. Price 3s. 6d.

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